S. Sutton Rawlinson.

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BY W. NEWTON,

CIVIL ENGINEER AND MECHANICAL DRAFTSMAN.

(Assisted by several Scientific Gentlemen.)

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No. LXXXV.

Recent Patents.

To WILLIAM EDWARD NEWTON, *of the Office for Patents*, 66, *Chancery-lane, in the county of Middlesex, mechanical draftsman, for improvements in diving apparatus, being a communication from a foreigner residing abroad.*—[Sealed 19th June, 1838.]

THIS invention of improvements in diving apparatus, consists of two parts: the first and principal feature being a box or case through which atmospheric air, to be supplied to the diver, when under water, is passed; and this box or case is denominated a "manometre," the object of which is to supply air to the diver in a regular and uniform manner, and not by puffs, as it would be, if conveyed to him directly from a pump.

The second feature of the invention consists in an improved apparatus, through which the diver is to breathe; and this apparatus consists of a small box containing two valves: one opening inwards, through which the diver draws the air

intended for his support, simply by the action of inhaling this, being sufficient to open the valve, and allow a proper supply of air to enter the lungs. The other valve opening outwards, is put in action by the diver exhaling the air he has breathed: the force with which the air is expelled from the lungs being quite sufficient to open the valve, and to effect its discharge under water.

In order that the invention may be better understood, I have appended hereto a drawing containing several figures, which I will now proceed to describe.

Plate I., fig. 1, represents a top or horizontal view of the manometre complete; fig. 2, is also an horizontal view of the apparatus, with the upper part or covering removed to show the internal arrangement; fig. 3, is a transverse section taken through the middle of the apparatus in the line *a, b,* of figs. 1, 2, and representing the manometre when it is partially distended, or, in other words, when it is nearly full of air; fig. 4, represents a similar view of the apparatus to fig. 3, but in this instance the air has all been supplied to the diver, and a fresh quantity is entering the manometre through the supply pipe: *a, a,* is a piece of wood, upon which the apparatus is fastened by screws or otherwise; *b,* a supply pipe, connected at one end, as seen in the drawing to the manometre, and, at the other end, to a reservoir of air in the boat above. The air in this reservoir is supposed to be highly compressed by means of an air pump. A flat tube, extending across the interior of the apparatus, is connected at one end to the supply pipe *b,* and at the other to the opposite side of the box; *d,* is a peculiarly-formed valve for admitting air to the interior of the box, which peculiar construction I will describe hereafter; *e, e,* is the lid of the box, hinged at *f,* the opposite end being closed, and kept air tight by means of a flexible covering *g,* made of India rubber, oiled silk, or

other suitable material. This covering *g*, is fastened at its edges to the sides of the box; and as the air enters the box, and forces up the elastic covering, it carries with it the lid *e*, to which the covering is attached, by screwing it between the said lid and an outer board *h*. A weight *i*, is fastened on the board *h*, for the purpose of keeping the lid steady, and causing the air in the box to be under slight pressure; *j*, is a spring attached to the extremity of a bent rod *k*, the opposite end of this rod being connected to the lid or cover *e*, by means of screws. This spring is intended to raise the cover or lid when it may be deemed desirable, the tension of the spring being regulated by a rod *l*, which has a screw cut at one end of it, and passed through a nut *m*, on the outside of the box. Fig. 5, is a detached view of the valve *d*, the flat pipe *c*, being shown in section. This valve consists of a short tube, closed at both ends, and having two ranges of circular holes formed in it, for the purpose of allowing the air to pass into the interior. It will be seen, by reference to the detached view, fig. 5, that an annular passage, *n*, *n*, is formed round the valve or tube *d*, in such a manner that air may be admitted into the interior of the tube from every one of the holes of the upper range; and it will also be seen that only the upper range can be put into connexion with the annular passage. The operation of the entire apparatus will, therefore, be as follows:—The diver will draw through the breathing pipe *o*, all the air contained in the box, and as it passes from the box, the cover or lid *e*, will naturally descend, as there will then be no power to overcome the gravity of the weight *i*; the consequence of which will be, that the lid will force down the valve *d*, and bring the upper range of holes into communication with the annular passage in the tube. The air from the supply pipe will then flow along the flat tube, and enter the upper range of

circular holes, and escape into the box by the lower range. The air, before under considerable pressure, will now expand in the case, and cause the lid to rise in the position shown in fig. 3; and a spring *p*, which presses against the lower end of the valve *d*, will cause the valve to keep in contact with the lid of the box.

The second feature of the invention, consists of an improved breathing apparatus, of which the drawings represent three methods of construction, in principle and action essentially the same.

Figs. 6, 7, and 8, are all views of the apparatus, shown in section; but as they are all so much alike, it will be sufficient to explain the construction of one of them only; fig. 8, is a section of the breathing apparatus complete; fig. 9, a detached front view of the mouth-piece; fig. 10, a section of the same; *a*, the fresh air pipe, connected at its opposite end to the pipe *o*, figs. 1, 2, 3, and 4; *b*, is the corresponding valve opening inwards, kept closed by a helical spring; *c*, and *d*, is that part of the apparatus which is applied to the mouth-piece. The exit valve *e*, opens outwards, and is kept closed by a spring *f*, except when breath is expelled from the lungs, when sufficient force is exerted by the breath to overcome the resistance, and the foul air is caused to escape by the pipe *g*. It will be seen that the breathing apparatus, as shown in fig. 8, is made in several parts capable of being detached: for instance, the valves are in two pieces, and slidden into the ends of the bent pipes *a*, and *g*; and the ends of these bent pipes, with the valves placed therein, are slidden into the mouth-piece shown at fig. 9, in the manner represented at fig. 8. This apparatus, however, may be made in one piece, if desirable, as shown in figs. 6, and 7. Fig. 11, represents a side view, and fig. 12, a back view, of a diver equipped, with the apparatus above described: *a*, is the box or ma-

nometre, supplied with air by the pipe *f*, and *o*, is the pipe which conveys the air to the diver; *q*, is the breathing apparatus, kept in contact with the mouth by a band from behind the head; *g*, a pipe for the exit of foul air, bent as seen in the drawing, so that in whatever situation the diver may be placed, the end of the tube is never uppermost, and, consequently, there is no danger of being drowned. The manometre is attached to a waistcoat, at the lower part of which a sort of bag is attached, made of any flexible waterproof material; a pipe *q*, is screwed on to a small pipe *b**, which branches off from the supply pipe *b*, and at the reverse end of *q*, are formed two small branch pipes, furnished with cocks; one of these pipes communicates with the interior, and the other with the exterior of the bag *r*; the tube *s*, is used to ensure a perfect communication with both sides of the bag, and is passed over the shoulders of the diver.

If it should be thought desirable, the head may be entirely enclosed in a helmet, so as to protect the nose and eyes from the water. But I do not claim this as any part of the invention.

In conclusion, I wish it to be understood that I do not intend to confine myself to the construction of apparatus herein set forth, as it is evident that many modifications may be made without departing from the principles. But I claim, firstly, the apparatus denominated a manometre, for supplying fresh air in a regular and uniform manner to the diver; and, secondly, an improved breathing apparatus, by means of which the diver is regularly supplied with fresh air every time he draws his breath, and which entirely prevents the possibility of his ever breathing over again the air that has once been expelled from the lungs.—[*Inrolled in the Rolls Chapel Office, December,* 1838.]

Specification drawn by Messrs. Newton and Berry.

To WILLIAM SOUTHWELL, *of Winchester-road, New-road, in the county of Middlesex, pianoforte-maker, for his invention of a certain improvement in pianofortes.*—[Sealed 24th August, 1837.]

THIS improvement is in the construction of a part of the mechanism called the action of a pianoforte, by which the pressure exerted by the finger of the player upon the key, is communicated to the hammer that strikes the string, and also to the damper which stops the vibrations. The improvement is the introduction of a small tong and spring in what is called the butt; it is designed to render the touch more delicate than in the ordinary construction, and, consequently, to facilitate the playing of rapid passages by ensuring the correct action of the hammer and damper.—[*Inrolled in the Inrolment Office, February,* 1838.]

To ARCHIBALD M'LELLAN, *of the city of Glasgow, coach-builder, for his invention of certain improvements upon the springs and braces of wheel carriages, and upon the mode of hanging such carriages.*—[Sealed 13th September, 1838.]

THIS improvement appears to apply solely to gigs, and consists merely in the form and attachment of the lateral springs, by which the body and shafts of the gig are connected to, and supported by, the axletree.

Plate I., fig. 13, is a side elevation of the gig; *a,* is the axletree; *b, b,* the spring connected at its ends by joints to straps *c, c,* from which the horns *d, d,* are suspended. The spring is formed of one piece of well-tempered steel, tapering both in width and thickness towards its ends.

We can give no further account of the construction and

novelty of this invention than the above, excepting by reciting the concluding paragraph, which states that the Patentee claims "a single plate or spring, consisting of one or more plates fastened by metal links or braces."—[*Inrolled in the Petty Bag Office, March,* 1839.]

To DAVID CHEETHAM, *of Staleybridge, in the county of Cheshire, spinner, for his invention of certain improvements in the means of consuming smoke, and thereby economising fuel and heat in steam engine or other furnaces or fire-places.*—[Sealed 14th August, 1838.]

THESE improvements, in the means of consuming smoke, and thereby economising fuel and heat in steam engine or other furnaces or fire-places, consist, firstly, in causing a quantity of atmospheric air to be mixed or combined with the smoke and other gaseous products of combustion in any convenient situation contiguous to the furnace or fire-place, and afterwards in returning the same through or over the fire in the furnace, for the purpose of effecting the entire combustion of the smoke or other gaseous product, previously to its having any communication with the flue or chimney. By thus passing the smoke or other gaseous products of combustion, in combination with a quantity of atmospheric air, over or through the fire, the smoke will be effectually consumed, and fuel greatly economized, in all furnaces or fire-places, used either for the generation of steam, evaporating fluids, or any other purpose where any combustible matter is used in furnaces or fire-places. This admixture of atmospheric air, with the gaseous products of combustion, and returning the same through or over the fire in the furnace, may be effected in any convenient manner that shall be most easily accommodated to the circumstances of the furnace where it is to be used; but I

should recommend that it be accomplished by the application or agency of rotary fanners or blowers, or pneumatic pumps, which may be worked by hand or any other power, and situate in any convenient place in connexion with the furnace, taking the supply of atmospheric air from adjustable apertures or openings made in the box or casting of the frame or blower; and thus mixed with the smoke or other gaseous products, and propelled by this apparatus through suitable flues, and thus conducting the same through or over the fire as may be found most desirable.

The second feature of my improvements consists in passing the smoke and other products of combustion from steam-engine or other furnaces through water by the application of the rotary fan, blower, or pneumatic pump as above alluded to, in order to clear, screen, or cleanse the gaseous products evolved from coal in process of combustion; and the small particles of coal, dirt, and other combustible matter, may thus be arrested and precipitated in the water, and again thrown upon the fire or furnace, and be perfectly consumed, and the fuel economized, instead of being allowed to escape into the flue or chimney.—[*Inrolled in the Rolls Chapel Office, February,* 1839.]

Specification drawn by Messrs. Newton and Berry.

To Thomas Ridgway Bridson, *of Great Bolton, in the county of Lancaster, bleacher, for his invention of certain improvements in the construction and arrangement of machinery or apparatus for stretching, mangling, drying, and finishing woven goods and fabrics; and part or parts of which improvements are applicable to other useful purposes.*—[Sealed 29th July, 1838.]

These improvements in the construction and arrangement of machinery or apparatus for stretching, mangling, dry-

ing, and finishing woven goods and fabrics, consist in the arrangement of mechanism for the purpose of performing these several operations continuously upon one combined apparatus or machine, in place of submitting the goods to be operated upon to several independent processes or operations by distinct machines in succession, which has hitherto been the common method.

In order that the object of these improvements may be more explicitly defined, and better understood, I have represented, in Plate II., my said improvements, having similar letters of reference marked upon corresponding parts of the mechanism in all the figures. Fig. 1, is a side elevation of a machine or apparatus constructed for the purposes above explained; fig. 2, is a horizontal or plan view of the same, as seen from above; and fig. 3, is an enlarged view of a certain part of the mechanism detached, in order to explain some features of novelty in the apparatus used to stretch the goods. Cast iron side framings or standards *a, a, a, a,* properly strengthened, and secured together by cross rails and stretchers, support the whole of the combination of apparatus, arranged in proper succession, in order to perform each consecutive operation.

The piece of goods, in the wet or stiffened state, is introduced into the machine by passing it over and under tension rails *b, b, b,* and is thus conducted under a guide roller *c,* to a circular series of stretching rails *d, d, d, d,* which are connected to arms or spokes *e, e,* mounted upon, and revolving round, drums *f, f, f, f,* as shown in fig. 3; such drums being attached to sliding telescopic tubes *g, g,* by means of pins or pivots, upon which they can be moved or turned, as upon axes, the two outside drums having each a flanch, in which there is a curved groove or slot; so that the drum may, by means of a screw, be set at any necessary angle to the telescopic tubes: these tubes are carried

by a stationary central shaft *h*. The two sliding telescopic tubes *g*, *g*, shown in section in fig. 3, have each a rack of teeth upon their under side, into which tooth pinions *i*, *i*, work; and thus the drums upon one tube, and, consequently, the arms or spokes, and rails connected with them, are drawn apart from, or set closer to, those on the other tube, in order to accommodate the apparatus to any width of cloth when it is first introduced.

It will be readily perceived, that when the drums *f*,*f*,*f*,*f*, are set obliquely on the telescopic tubes, by means of the slot and screw above described, the arms or spokes connected with the drums will revolve obliquely to the centre of the tubes; and thus the ends of the spokes or arms will expand and contract the stretching rails *d*, *d*, *d*, *d*, as they revolve, and thereby distend the cloth to the required width. The cloth is to be tightly held upon these stretching rails by means of endless bands *j*,*j*, (see fig. 1,) passing in grooves over them, and also over tension pulleys or rollers *k*, *k*, which also must be telescopic, in order to correspond with the variable widths of the stretching rails.

Now, it will be perceived that, as this stretching apparatus revolves in the ordinary manner, the cords *j*, *j*, will hold the selvages of the cloth tightly over the stretching rails *d*, *d*, *d*, *d*, until the two delivering rollers *l*, *l*, will take the cloth from off the stretchers, and conduct it immediately (before it has time to run up or shrink) on to the large cylinder or bowl *m*, *m*, *m*, *m*.

I consider the improvements in this part of the machinery to consist in the application of the telescopic apparatus above described, and the combination of the bands or straps, with the stretching rails for holding the cloth, as before set out. I may here add, that the stretching apparatus is revolved or driven by the friction of the cloth, just as the stretching machines in general use are driven. The

bowl or cylinder *m, m,* which, in its present situation, is to be considered as the main feature of my improvements, is constructed as a hollow chamber or circular passage, having its outer periphery or surface turned and highly polished, and supported upon arms *n, n, n, n,* mounted upon the hollow centre or axis *o,* and running in pedestals attached to the said framings *a.* The whole of this bowl or cylinder *m, m,* is to be heated by steam, passing from its hollow central shaft to the interior of the cylinder by a pipe, or by any other convenient means; and is provided with a circular rack of teeth *p, p,* proceeding round its periphery near one of its outer edges, (see fig. 2,) into which a toothed pinion *q,* driven by a strap and pulley, or suitable wheelwork in connexion with the steam engine or any other impelling power.

The pieces of goods under operation being, as before described, just introduced upon the surface of the cylinder or bowl *m, m,* and tightly held in its stretched state by the two delivering rollers *l, l,* it immediately proceeds around the polished periphery of the cylinder *m, m,* and is operated upon by bowls or rollers *r, r,* placed at suitable distances round the cylinder, and which revolve by contact of their surfaces. These rollers or bowls are set or brought to any degree of pressure, by means of the tightening screws *s, s, s, s*; and the piece of goods being operated upon, becomes mangled, calendered, and finished during the process of drying, by the operation of the successive system of bowls upon the cloth as it passes over the cylinder *m, m,* until it is delivered in the finished state from the cylinder at *t.*

It will be very evident to practical persons conversant with these processes, as at present conducted, that by passing the cloth around the bowl or cylinder *m,* as just described, any degree of finish may be imparted to the goods

whilst they are drying upon the surface of the heated bowl or cylinder, by varying the degree of pressure of the top or pressing rollers or bowls; and also, by making a corresponding variation in their number, or by gearing them so that they shall run at a greater or less degree of speed, as may be found desirable; or the goods may be taken off from the cylinder when any sufficient degree of finish has been imparted to them by this combination of mechanism or apparatus, by delivering the piece from the machine by the aid of a pair of delivering rollers, which may be attached to any required part of the machinery, as shown at *w*, *w*, providing the cloth is ascertained to be sufficiently dried.

It will, of course, be evident that in the construction and arrangement of such a combination of apparatus, I am neither limited to the precise dimensions, order, or number of any of the before-mentioned rollers, bowls, or cylinders, nor to the materials of which they are composed; but as all such operations must be governed by the discretion of the operator, and of the peculiar demand of finish the goods shall require, such variations in performing the combined process must be left to the judgment of the workman; and any degree of finish hitherto produced by mangles or calenders separately, may then be obtained in working the above-described combination and arrangement of apparatus for stretching, mangling, drying, and finishing woven goods and fabrics.

And lastly, with respect to part or parts of these improvements being applicable to other useful purposes, I would recommend that in those instances where it is only necessary to perform the operations of stretching, drying, and finishing (without the operations of mangling or calendering) some particular description of woven goods, that a very simple plan be adopted, consisting of an apparatus composed of two circular discs or plates mounted upon a

central shaft; and these plates shall either be stationary or revolve, as may be found desirable. These plates or discs are to be placed parallel to each other, and sufficiently capable of adjustment to admit of any width of cloth to be stretched and dried thereon. The cloth is to be passed round or over these plates by means of straps and tenter needles, or otherwise, having the edges or selvages over or upon the edges or peripheries of the discs; thus forming, as it were, a perfect cylinder, into the body or interior of which, hot or cold air, or both, is to be propelled by means of a revolving fan placed in any situation that shall be most convenient; and it will be found that the propulsion of the air through or against the underside of the cloth forming the interior of the cylinder, having a direct and rapid action against its surface, will thus effectually dry the goods while in their stretched or distended state.—[*Inrolled in the Rolls Chapel Office, November,* 1838.]

Specification drawn by Messrs. Newton and Berry.

To Pierre Frederick Fischer, *of Great Marlborough-street, in the county of Middlesex, merchant, for certain improvements in pianofortes, communicated to him by a foreigner residing abroad.*—[Sealed 13th May, 1835.]

The subjects of this patent are rather numerous and various, and are extended to a considerable magnitude, both in the description and drawings, without much attention to clearness. We shall, however, consider it sufficient, in this instance, to give but a slight report of the matter, from a conviction that the invention is neither one of general interest, nor are the novel points at all obvious.

One of the features is, the construction of the action

mechanism to be applied to a pianoforte, in which the tones are produced by the vibrations of metallic springs.

These sounding springs may be of a variety of forms, either coiled in helical curves, convolute curves, zigzags, or other bent shapes; or they may be of straight rods, bars, or forks, or a combination of these in various ways. The mode of bracing the framework of the instrument constitutes one feature; and the effect of the touch upon the keys may be varied by an adjustable contrivance. The sounding board is placed in connexion with the head or tympanum of a kettle drum, in order to produce a brilliancy of tone; and the instrument is mounted upon castors, which have helical springs in their sockets, to prevent derangement when moved about.—[*Inrolled in the Inrolment Office, November,* 1835.]

To John Godwin, *of Cumberland-street, Hackney-road, in the county of Middlesex, pianoforte-maker, for his invention of an improvement in the making or constructing of pianofortes.*—[Sealed 8th March, 1836.]

This invention is, arranging the strings of a pianoforte in two distinct series; that is, placing such of the strings as constitute about the first three octaves in parallel lines along the instrument, and the remainder of the strings in parallel lines at acute angles transversely of the former; the object being to afford, what the Patentee calls, a more open scale to the strings.

The strings are distended in the usual manner, but the frame and bridge of the upper series of strings must be about a quarter of an inch higher than that of the lower series; and the sounding board must be cut away, and sup-

ported by iron pins, at such parts as shall be required for letting the hammers through.

The advantages of this arrangement are, that the upper or treble strings can be made of greater length by being placed transversely, and consequently, their tones improved.

As this plan of arranging the strings applies to upright pianofortes, and to other denominations of such instruments, it is unnecessary to point out particularly the way in which such strings should be fixed, as that will depend in a great measure upon circumstances; and as to the striking parts, or what is called the action, such constructions may be employed with striking upward or downward, as may be desired, that constituting no part of the invention.—[*Inrolled in the Inrolment Office, September,* 1836.]

To CHARLES BOURJOT, *of Coleman-street, in the city of London, merchant, for his invention of improvements in the manufacture of iron.*—[Sealed 3d August, 1838.]

THE Patentee describes iron as containing carbon and several other matters, which are consumed by the heat of the furnace; the difference between cast iron and wrought iron being, that the former contains a matter which, when the iron is pressed, may be forced out by rolling or pressure, and the cast iron, by this means, converted into malleable or wrought iron.

The facility with which all sorts of forms or figures may be produced in cast iron is mentioned, but the disadvantage of the brittleness of that material renders it unfit for vases and many other ornamental articles; on the other hand, the great expense of producing such forms in wrought iron, renders that operation impracticable in many cases.

The object of the Patentee, therefore, is to purify cast iron articles so as to deprive them of their brittleness, and he proposes to do it in this way. After the articles have been cast, he places them in layers in an oven, like those in which china is burnt, laying a thickness of oxide of manganese, with charcoal or coke in a powdered state, between each layer of the cast metal articles. In this state they are submitted to a suitable heat, and remain for three days; after which, being allowed gradually to cool, the cast iron articles will be found to have lost their brittleness.—[*Inrolled in the Inrolment Office, February,* 1839.]

To Richard Treffry, *of Manchester, in the county of Lancaster, chemist, for his invention of certain improvements in the method of preserving certain animal and vegetable substances from decay, and also in the apparatus for and mode of impregnating substances to be preserved.*—[Sealed 23d July, 1838.]

My improvements in the method of preserving certain animal and vegetable substances from decay, consist in steeping the substances to be preserved in the following solutions or compounds. The principal solution to be used, is made either from the muriate of tin, or the nitrate chloride or muriate of copper, dissolved in certain quantities in pure water. Of these salts of copper, I prefer the chloride or muriate. The auxiliary solution, in which articles to be preserved are to be previously steeped or saturated, is claimed as new only in its present application in assisting the above process, and consists in precipitating from any of the aforesaid salts or their solutions their oxides, either in a pure or combined state, and impregnating therewith the substances to be preserved from decay

by the use of any of the mineral, vegetable, or volatile alkalies, or alkaline earths, either in a caustic, mild, or combined state; of which alkalies or alkaline earths, I prefer soda and lime.

I wish it here to be understood, that the certain substances intended to be steeped or saturated in the abovementioned solution are as follows: namely, all kinds of wood and timber, canvass cloths and all woven fabrics, whether manufactured from flax, hemp, silk, wool, or any other fibrous material, and the shreds or yarns of which the same may be composed, either in the raw or manufactured state; also rope, cords, and such similar articles; paper in the pulp, or finished state, and also vellum, parchment, leather, and other skins, either raw or manufactured, and feathers. The process for accomplishing the above purpose is thus performed, after providing tanks, cisterns, or vessels of any suitable materials and dimensions. Supposing the substances to be preserved are linens, or such like fabrics, I dissolve any of the before-named salts of copper in pure water, which, if used in a heated state, will be found to facilitate the operation in the proportion of about one pound to six gallons of water, or more or less, according to the nature and thickness of the material under operation; and in a separate vessel I dissolve about one pound of soda ash, containing about forty-five per centum of alkali, in four gallons of water; or I diffuse the same quantity of fresh burnt lime in a similar quantity of water, or an equivalent quantity of any of the other alkalies, or alkaline earths; in which last-named solution or mixture, I immerse or steep the substances to be preserved, from one to six hours, according to the thickness of the material to be saturated.

This solution or mixture will require to be occasionally stirred or agitated, in order to cleanse and facilitate the

absorption of the liquor by the materials under operation. When the materials are found to be completely saturated, they are to be removed from this vessel, and all the superfluous liquor drained or pressed from them by any convenient means, and afterwards dried.

The goods are now to be wholly immersed in the other tank or vessel containing the metallic solution, where they must be allowed to remain from one to twelve hours, or more or less, according to their thickness and nature. The article under this operation should occasionally be agitated and turned during this process, in order to enhance its effect; and after being subjected to this operation, and removed from the tank and dried, the process will be complete.

It is not of any material consequence in which of these solutions the substances are first steeped, provided care be taken to remove all the superfluous liquor remaining from the first immersion, whether alkaline or metallic, previously to submitting them to the second; and if they can be dried between the first and second operation, the process would be more effectual.

Animal substances are to be treated much in the same way as just described, except that with them none of the alkalies or alkaline earths must be used. It must also be observed, that where it is an object to prevent discoloration, as in white cotton goods, that muriate of tin may be employed in the same manner as the salts of copper. For linen, hemp, animal and ligneous substances, it is altogether objectionable. In the case of timber, and all ligneous substances, I place it in a tank, and having previously prepared the solution of any of the aforesaid salts of copper (of which salts, however, I prefer the chloride or muriate, which I use in the proportion of about one pound to six

gallons of water), I then allow the solution to run into the tank in sufficient quantity to cover the timber or other materials under operation completely. In this state of immersion, the substances should remain from one to thirty days, according to their nature and thickness; the liquor may then be pumped or drawn off, and the timber or other substances allowed to dry, when it is ready for use.

And, lastly, I wish it to be distinctly understood, that I claim as my invention the use or employment of any of the before-named salts of tin or copper, without the aid of any of the alkalies or alkaline earths, which, though rendering the process more effectual, is not indispensable. But as the use of any of thealkalies or alkaline earths, either in a pure, mild, or combined state, is an advantage, and part of the process generally employed by me, I claim their exclusive use as a part of my method for preserving certain animal and vegetable substances from decay, whether any of the before-named salts of tin or copper, or any other salts of those or any other metals be employed for that purpose.—[*Inrolled in the Rolls Chapel Office, January,* 1839.]

Specification drawn by Messrs. Newton and Berry.

[Since the sealing of the above patent, the Patentee has entered a disclaimer of the latter part of the title, as he finds that that portion of the invention which relates to "the apparatus for, and mode of, impregnating substances to be preserved," is not new. The title of the patent, therefore, now stands thus:—"certain improvements in the method of preserving animal and vegetable substances from decay."—Ed. Lond. Journ.]

To ROBERT SANDIFORD, *of Tottington Lower End, in the county of Lancaster, block-printer, for his invention of certain improvements in the art of block-printing.*— [Sealed 22d June, 1838.]

MY improvements in the art of block-printing, and in certain arrangements connected therewith, consist, firstly, in the peculiar construction of the block from which the impressions are made upon calicoes, muslins, silks, paper, and all other fabrics in the ordinary art of block-printing by hand. The particular feature of novelty in the construction of these printing blocks, is effected by making a light framework of wood, metal, or other suitable material, carry the design or pattern to be printed, instead of having it formed by "cutting and brassing" upon a solid block, as heretofore practised.

It is well known to practical block-printers, that hitherto printing blocks have been exceedingly limited in their dimensions, owing to any increase from the usual size, making them much too heavy for the workmen to use; and also that their liability to cast or warp would be increased, whereas, even in their present small size, they are very subject to split and lose the evenness of their surface.

These objections to the use of large blocks, are completely overcome by my present invention. By the use of light open frames, instead of solid blocks, I am enabled also to avail myself of many other practical advantages; for instance, the framework, or bed, is a permanent block, upon the various rails of which I can screw or otherwise fix patterns or designs, and remove them to be replaced by others with great facility, and also make use of the "faces" or designs taken from old blocks; and by dividing or cutting them up, I am enabled thus to select

any parts or portions of such designs, and form a whole or new pattern by any desired arrangement of the dissected parts upon the frames. Without enlarging further upon the peculiar advantages of these improvements, I will now proceed to refer to the drawing attached to these presents, in order that the practical effects of the same may be more easily understood.

Plate I., fig. 1, represents a light framework of wood, which I substitute in place of the solid block in common hand printing: this frame consists of plain light rails *a, a, a, a,* firmly secured together; but it is evident it may be constructed in any other form, or of any other light material, as light metal tubing, or any other suitable substance. Upon this frame thin slips of wood, or other material, as fig. 2, having the pattern or design intended to be printed, formed upon them, are to be screwed upon the frames in separate rows, or any other order, that shall produce the print required; as, for instance, if the goods to be printed are to be handkerchiefs or shawls, for which these improvements are particularly adapted, then the frame will have the centre or filling made up as *b, b, b, b,* in fig. 3, and have a complete border pattern also fixed upon the frame, as at *c, c, c, c,* in fig. 3, and with one dip of the block produce the complete handkerchief at one impression; fig. 4, shows a whole handkerchief printed in one colour by a single impression of the block, and the complete pattern made up of small slips properly arranged upon the frame *a, a,* but which, by themselves, would only print strips. In fig. 5, *d,* represents the border pattern, and *e,* the centre or filling pattern. In most cases, that is, in handkerchiefs of two feet, or two feet six inches square, I am by these means enabled to print an entire handkerchief; but where the shawl requires to be larger, or four times that size, it must be produced by four points, arranged upon the

frame as in fig. 6, and the block turned at every impression until the whole is completed. It will also be very evident to block printers, that where the impressions to be made are for garment cloths, and not for handkerchiefs, the patterns must be suitably arranged upon the frames, and which needs no further explanation, as a printer will be aware that he may make any alterations with these improvements as the particular arrangement of the pattern and colours may require; fig. 7, is a section taken through the frame and pattern.

Secondly, in printing piece goods in the entire length, these improvements possess considerable advantages, as an entire piece, by the use of these frames carrying the design to be printed, may be completed in a few minutes in three colours as follows:—Place three ordinary printing tables, end to end, in one length, and with three printers, each having his own block or frame of the same size square as the width of the piece of goods, and also furnished with his own sieve of colour, the first printer, with one dip, puts on his object or print in the ground colour, and the cloth immediately is passed to the second or third printers to receive their shades or colours upon the same ground; and thus the whole piece is successively printed in three or more colours from end to end. In order to complete this rapid operation of block-printing with the best effect, the printed cloths must pass over a cylinder or drum, placed at the end of the last table, and heated by steam, or otherwise, as patented by Messrs. Backhouse and Grime, and bearing date the 7th of March, 1837, whose drying apparatus will be found the best to be used in connexion with the aforesaid arrangements for rapid printing.

Lastly, I propose a further improved arrangement of the blocks connected with the art of block-printing, a print or impression of which is represented in fig. 8. This

is accomplished by having the print *f*, *f*, *f*, and the two objects *g*, *g*, *g*, and *h*, *h*, *h*, so arranged upon the block, that by one impression of the same, three or any number of colours may be printed from them, and thus distinct objects or designs, and in different colours, may be printed at once. The sieve of colour upon which the block or frame is to be dipped before printing, must be made in three or more compartments, having partitions, and each containing its own separate colour; and thus it will be evident that the pattern may be completed by three impressions of the same block, and by one printer advancing one-third the size of the frame at every impression, and thus completing the pattern as shown at fig. 9.

There is another practical advantage arising from the use of these open frames and patterns in block-printing, which will also be readily observed by persons conversant with the art. The openings or interstices *i*, *i*, *i*, *i*, see fig. 3, between the frame of the block, and the patterns or devices upon the slips *b*, *b*, will prevent any air from being confined between the face of the block and the sieve cloth, when the block is dipped to receive the colour, and thereby the block will "furnish" with colour, without being interrupted by confined air-bubbles, which frequently occur, and prevent the colour from being evenly received by the block. I wish it to be particularly understood that I do not confine myself to the particular construction of the frame for carrying the "faces" or figures of the design for printing, nor to any material or dimensions of which the same may be made; but as the objects of my improvements have been particularly explained and distinctly set out in the foregoing description, any slight modification of the same I shall consider as an evasive imitation.—[*Inrolled in the Rolls Chapel Office, December*, 1838.]

Specification drawn by Messrs Newton and Berry.

To WILLIAM GARNETT, *of Haslingden, in the county of Lancaster, dyer, for an invention of certain improvements in machinery for spinning and doubling wool, flax, cotton, silk, and other fibrous materials.*—[Sealed 19th June, 1838.]

THESE improvements in machinery for spinning and doubling wool, flax, cotton, silk, and other fibrous materials, consist in a novel arrangement of mechanism or apparatus to be employed for such purposes, and so constructed and arranged that any requisite length of draft or stretch may be given to the roving, in drawing it to the required fineness, previous to spinning it upon the bobbin or spindle. The roving of fibrous material under operation, is enabled to receive this stretch or draft between the front and back drawing rollers, by being slightly twisted by passing between the surfaces of an endless strap or belt, so contrived that the inner or rubbing surfaces shall run nearly in contact and in opposite directions, and thus twist the rovings during the draft or stretch, which is being performed by the front and back drawing rollers previous to the operation of spinning or twisting by the spindle and flyer, or the twist may be given to the rovings in this situation by any other suitable contrivance adapted to the purpose; the contrivance for giving the twist being placed between the front and back drawing rollers.

But in order that these improvements in spinning machinery may be more perfectly explained, and better understood, we have shown in Plate II., various representations of a machine for spinning, so arranged and modified as to exhibit the practical application of these improvements, and in which similar letters of reference are marked upon corresponding parts of the mechanism in all the figures. But it will be perceived that many ordinary parts

of spinning machinery are also here introduced, as being merely auxiliary to the application of these improvements, and as such it will not be necessary very particularly to describe them.

In the accompanying drawing, fig. 1, is a front elevation of the improved spinning machine; and fig. 2, is a plan or horizontal view of the same, as seen from above; fig. 3, is a side or end view of the same; and fig. 4, is a sectional representation taken transversely through the machine, about the situation of the line A, B, in figs. 1, and 2. The upright standards or framings are shown at *a, a, a, a,* which support the rollers *b, b,* and upon them the roller stands *c, c,* are mounted, carrying the back drawing rollers *d, d.* The rovings having been previously prepared and suitably coiled upon bobbins or spools, are placed in the centre of the machine as at *e, e.* These bobbins are made to contain any required number of ends of rovings, which are taken off back and front, as shown in the drawing; each coil being wound separately upon the bobbin, and side by side, so that they may be drawn off readily. The bobbins upon which the rovings are coiled, are supported in morticed standards *f, f,* upon wooden surface rollers *g, g,* which are driven by suitable gearing, in order to deliver the rovings into the back drawing rollers, an endless travelling belt, strap, or band, *h, h, h,* (being the most suitable means) for putting the twist into the rovings as they pass from the back to the front drawing rollers, (which are, of course, to be suitably geared in order to give the necessary draft or stretch,) is placed immediately behind the front set of drawing rollers, so that a sufficient degree of twist is given to the rovings to support the fibres during the draft or stretching operation, between the front and back drawing rollers.

The spindles, flyers, and bobbins for spinning the yarn,

are shown at *i, i, i, i,* bearing in the bolster rails *j, j,* and upper plates *k, k,* and supported upon the copping rail *l, l,* in the ordinary manner, being driven by bands passing from the horizontal drum *m, m,* around the wharves or pulleys with which the flyers are furnished, as in ordinary throstles, where the dead spindle is used.

Now, in order to put this improved spinning machinery into operation, rotary motion must be given to the fast driving pulley *n,* which being fixed upon one end of the drum shaft *o, o,* will, by means of the spur pinion *p,* at its other end, drive the internal spur wheel *g*: around the outer periphery of the wheel *g,* the straps *r, r,* are passed, driving the pulleys *s, s,* fixed upon the ends of the set of front drawing rollers *t, t*; and thus, by means of the mitre wheels *u, u,* cross shafts *v, v,* and change pinions *w, w,* actuate the bevil wheels *x, x,* upon the end of the set of back drawing rollers *d, d.* Upon the extreme end of this set of rollers, there is a spur pinion *y,* taking into an intermediate wheel *z,* in gear with the wheel *i,* upon the ends of the shaft of surface rollers *g, g.* Now, as these rollers revolve at suitable speeds, and thus deliver the rovings to the back drawing rollers *d, d,* the rovings will be drawn forward, and are to be passed between the travelling twisting belts *h, h,* and between the front drawing rollers *t, t.* These endless belts *h, h,* are driven by means of an endless strap 2, passing around the pulley 3, which is fixed upon one of the cross shafts *v*: this driving strap is conducted by tension or guide rollers 4, 4, around the pulley 5, fixed at one end of the conical drum 6; and from this drum 6, another strap 7, is passed around the other conical drum 8, mounted upon the horizontal shaft 9, which carries the pulleys 10, 10, at each end, and thus drives the twisting belt or band *h, h.*

It is necessary here to remark, that in order to keep the

action of the rubbing surfaces of the twisting belt uniform upon all the rovings, there is a thin plate of metal or other substance placed between the inner surfaces of the belt, and between each roving, in order to keep the whole length of the belt at equal distances apart; and there are also small presser rollers 11, 11, 11, 11, placed in bearings above the belt, for the purpose of preserving an uniform pressure upon all parts of the travelling belt *h, h*. It will be evident that any required degree of speed, and, consequently, any requisite twist obtained, may be given to this travelling belt, by shifting the strap 7, upon the variable surfaces of two conical drums; and for securing the alteration of speed, when thus adjusted, there is a bar 12, pierced with holes, into which pins may be inserted upon each side of the driving strap.

The copping motion may be performed in any ordinary manner, and suitably contrived to spin cops or bobbins, as, for instance, by the mangle pinion and wheel 13, actuating the quadrant rack 14, and lifting chains 15, or by any other well-known means.

It will readily be perceived by persons conversant with the process of spinning, that by these improvements in spinning machinery, namely, separating the front and back drawing rollers, and putting in a sufficient degree of twist to the rovings to sustain or support them during the stretching process, by whatever means it may be performed, that the rovings may be drawn down to any degree of fineness, previously to being spun, and the yarn will also be equalized in quality and strength throughout. In those cases where it is deemed necessary to draw down the rovings, several degrees or "numbers" of fineness, previously to spinning, it will be necessary to place the roving bobbins or spools in front of the machine above the spin-

dles, and thus allow the rovings to be coiled thereon separately side by side.—[*Inrolled in the Rolls Chapel Office, December*, 1838.]

Specification drawn by Messrs. Newton and Berry.

To JAMES CRELLIN, *of Liverpool, in the county of Lancaster, and* JAMES HOLT, *of the same place, plumbers, for their invention of certain improvements in water-closets.*—[Sealed 24th August, 1837.]

THESE improvements in water-closets consist, firstly, in a novel arrangement of apparatus or combination of mechanism constituting the working parts of the closet, and designed to regulate the supply and exit of the water to and from the basin, in order to cleanse it after use.

By the particular construction or arrangement of our improved water closet, it is not necessary to have the water service or cistern in immediate connexion with it, which is necessarily the case with ordinary closets, and from whence frequent inconvenience arises, as the principal difficulty in working those in common use is the great liability of the cranks and wires, forming the connexions between the valves of the cistern and the closet, to get disordered and out of repair, and, which parts we have entirely dispensed with. Now, the cistern, reservoir, or service of water to supply our improved closet, may be placed in any convenient situation, and without reference to its distance, provided it is erected a little above the seat of the closet; and one reservoir is hereby also enabled to supply any number of closets in a range of building, which it is impossible to effect with the ordinary construction of closet, owing to the complicated arrangement of connecting wires

and bell-crank levers, which must necessarily be made between the valves in the cistern and those of the water-closet; and instead of requiring one main water pipe to serve each separate closet, as commonly used, our arrangement of the mechanism will require but one main pipe to supply any number of closets in the same range of buildings. Secondly, our improvements consist in a modification of a similar construction of apparatus or combination of mechanism in order to render the same self-acting, that is, by the cleansing the basin of the water-closet without the trouble of drawing up the piston rod, as in the ordinary closet; and as this improved mechanism is actuated by the person rising from the seat, the principal advantage is, the impossibility of leaving the basin of the closet in a foul state after use. In both of these improved water-closets, the earthen basin delivers the soil and water at bottom through a dish-valve into the iron pan or receiver, from whence it passes into the discharge pipe, which communicates with the common sewer or other receptacle, as usual; and thirdly, our improvements consist in the application of a two-way cock to the main supply pipe of the closet, in order to admit hot or cold water into the basin of the closet at pleasure.

In order that our improvements may be fully understood, we have shown, in Plate II., a representation of the water-closet, which will be explained by reference to the following description:—Fig. 1, represents a front elevation of our improved water-closet, with the working parts shown in a quiescent state: *a*, is the earthenware basin; *b*, *b*, the iron box or receiver; and *c*, the common discharge pipe, which is to be provided with the ordinary trap or valve to prevent the escape of any effluvium; *d*, is a valve box, containing a valve opening downwards, (see detached sectional figure 2.) This valve box is always charged with water, being con-

nected to the cistern or reservoir by the main or supply pipe *e*, which is also always full; *f*, is the service pipe, for supplying water to the basin of the closet; a branch *g*, from this pipe also supplies the float box *h*, with water: this box *h*, contains the float *i*, suspended at the end of the lever *j*, having its fulcrum at *k*; *l*, is the plunger of the water valve *n*, and is attached to the lever *j*. Now, it will be perceived that the rise and fall of this float *i*, entirely commands the supply of water to the basin of the closet by effecting the opening and closing of the valve *n*, in the box *d*. Supposing the water-closet, with all the working parts, to be in the positions shown in fig. 1, that is, in a quiescent state, in order to bring the same into action to cleanse the basin *a*, after use, the piston rod *o*, must be raised by hand, as usual: which raising, the lever *p*, will, by means of the morticed crank piece *q*, immediately open the dish valve at the bottom of the basin *a*, (as shown by dots in fig. 1,) and allow the soil to fall into the discharge pipe; and simultaneously the valve *r*, being connected to the end of the lever *p*, will be lifted from its seat, and the water running also out of the float box *h*, into the discharge pipe *c*, will cause the float *i*, and lever *j*, to descend, thus opening the water valve *n*, and affording a supply of water to rinse or cleanse the basin of the closet: upon the descent of the piston rod *o*, the valve *r*, of the float box is immediately closed; and thus, as the float *i*, gradually rises, it will shut the valve *n*, and all the parts will resume their former position.

Fig. 3, represents a front elevation of a similar construction of water-closet, with some additional mechanism, in order to render the same self-cleansing, and is drawn with the working parts in the position they assume when the weight of the person is upon the seat of the water-closet. In this figure, also, *a*, represents the basin; *b*, the iron box or receiver; *c*, the discharge pipe; *d*, a water valve, of

precisely similar construction to that previously described, and supplied with water in the same manner, by the supply pipe *e*: *f*, is the service pipe, to conduct the water to the basin; and *g*, the branch pipe, to supply the float box *h*, containing the float *i*, which is suspended at one end of the lever *j*, having its fulcrum at *k*, as previously described; the water valve *n*, in the box *d*, is similarly attached to the lever *j*. Now, supposing the weight of the person to be upon the seat of the closet, the rod or plunger *m*, will be depressed, which acting upon the lever *o*, will open the valve in the float box *h*, and allow the water to flow therefrom; but the float *i*, is kept in its elevated position by the lever *o*, also acting against the underside of the stud or pin *p*, fixed in the lever *j*, and thus keeping the water valve in the box *d*, closed. Upon the person rising, and the seat being relieved from the weight, the self-acting parts are set in motion, that is, the rod or plunger *m*, will rise with the seat (see the dotted lines in this figure), and release the lever *o*, from bearing against the stud or pin *p*, in the lever *j*, the float *i*, will descend, and, consequently, open the water valve in the box *d*; the descent of the float *i*, will also cause the short lever *q*, to trip the lever *r*, which, by the assistance of the morticed crank piece *s*, and the weight of water now rushing into the basin, will open the dish valve at the bottom of the basin, and precipitate the soil and water into the discharge pipe below: there is a small click or catch piece *r**, fixed upon the crank piece *s*, which catches into a notch formed upon the lever *u*, suspended above it, and keeps the dish valve open during the cleansing of the basin; and as the water is also flowing into the float box *h*, through the branch pipe *g*, the float *i*, will gradually ascend, releasing the catch *l*, from the lever *u*, and allow the counterbalance weight *v*, to close the dish valve under the basin, and, at the same time, cause the

lever *j*, to shut the water valve in the box *d*, and stop the supply.

It will be seen that in either of these constructions of water-closets, a two-way cock may be applied to the supply pipe *e*, in order to turn either hot or cold water into the basin, as may be desirable: this tap is represented at *w*, in figs. 1, and 3; and a small branch pipe may also be conducted from the main pipe *e*, into the bath room or dressing closet at pleasure.

Having now described the particular combination of mechanism or apparatus constituting our improvements in water-closets, we intend it to be understood that we do not claim any of the ordinary or well-known parts of water-closets now in use, nor to confine ourselves to the precise situations or dimensions of the new arrangement of mechanism above described. But we do claim the peculiar arrangement of apparatus as shown in the drawings, and above described, for the purposes and in the manner there represented.—[*Inrolled in the Rolls Chapel Office, February,* 1838.]

Specification drawn by Messrs. Newton and Berry.

To Charles Schafhautl, *of Dudley, in the county of Worcester, gentleman, for his invention of certain improved apparatus for puddling iron.*—[Sealed 13th June, 1836.]

In the manufacture of iron, there is a process called puddling, which consists in stirring lumps of the metal about, in a half fluid state, in a reverberatory furnace, for the purpose of bringing the metal into a more momogenious state, and rolling it up into balls, which renders it fit to be wrought by hammers or rollers into bars or pigs. This

puddling operation is usually performed by men who use a long bar, and keep continually stirring the lumps about in the furnace, until the whole of the metal is worked up into a ball in a sort of plastic state.

Considerable care, dexterity, and observation is required to preserve a uniform heat, and to perform the puddling operation successfully and completely through the whole mass of metal operated upon in the furnace. This necessarily limits the size of a puddling furnace, and the quantity of iron at one time under operation, as the intense heat of a very large mass would be insupportable to the workmen.

The Patentee proposes, instead of employing men for this laborious and fatiguing operation of puddling the iron in the furnace, to work the puddling tool or stirring bar by machinery.

It is necessary that this puddling bar should move uniformly to and fro in horizontal directions through the mass of iron; which is effected by passing the bar through a small hole in the furnace door, and applying the moving power to its outer end as a lever. For the better action of this lever, it is made to turn upon a vertical spindle as its fulcrum; and in order that this lever may be enabled to slide in and out of the furnace, it is mounted in a rocking frame, moved by a crank and levers.

The Patentee does not confine himself to the particular construction of machinery shown in his drawings, but claims the exclusive right of working the puddling tool by machinery instead of hand labour. He also claims the use of doors or dampers under the furnace, which enables him to regulate the heat within. By the employment of these means, a much larger furnace can be used, and a greater quantity of metal operated upon at one time, than could be by the old mode of hand labour.—[*Inrolled in the Inrolment Office, December,* 1836.]

To John Ericsson, *of Brook-street, New-road, in the county of Middlesex, civil engineer, for his invention of an improved propeller, applicable to steam navigation.*—[Sealed 13th July, 1836.]

Two wheels of equal diameter are placed concentrically, and nearly close together, at the stern of the vessel. Round the periphery of each of these wheels, a series of vanes or paddles are fixed, in spiral or angular positions; the vanes on one wheel being placed at opposite angles to those of the other wheel.

The axle of one of the propelling wheels passes through the hollow axle of the other, and they are made to turn in opposite directions by coupling toothed wheels upon crank shafts, moved by a crank rod connected to a steam engine.

The Patentee says that the outer wheel is intended to make a greater number of revolutions than the inner wheel: this, we do not see the possibility of effecting under the arrangement set out in the drawing, as the cranks of both shafts of the coupling wheels are connected by a strap, and the coupling wheels working together are of equal diameters.—[*Inrolled in the Inrolment Office, January,* 1837.]

[In vol. vii., of our second series, page 216, and Plate VII., figs. 14 and 15 of that volume, will be found the description of Dr. Church's modes of propelling vessels on water, forming part of his patent of 25th October, 1829, which appears to be, both in construction and operations, exactly like the invention claimed as the subject ef the above patent.—Ed.]

To John Ericsson, *of Union Wharf, Albany-street, Regent's-park, in the county of Middlesex, engineer, for his invention of certain improved machinery applicable for propelling vessels.*—[Sealed 10th October, 1834.]

This is an adaptation of what is commonly called the duck's-foot paddle, that is, a propelling apparatus formed by two broad flaps, opening and closing on joints in the middle, like the two lids of a book. These propelling flaps are attached to the outer end of a piston rod, which, as the piston moves by the power of steam to and fro in a horizontal cylinder, projects the propeller out at the stern of the vessel and draws it back again.

The flaps are each connected to the end of the piston rod by joints at their inner edges; but each flap also turns upon an horizontal axle crossing its middle, which is supported by a frame, so that, in the act of projecting the piston rod outward, the flaps are opened, and their broad surfaces presented to the water for the purpose of propelling the vessel; and when the piston recedes, the flaps are made to collapse, and return through the water edgewise, so as to offer little or no resistance.

The rod, to the end of which the flaps are immediately attached, slides within another rod, made hollow to receive it, and has a connexion to an eccentric, which gives it a small sliding movement, independent of that of the piston rod, in order that the flaps may be accurately opened and closed at the proper times, whilst the outer rod, immediately connected to the piston, and moving with it, carries the frame in which the axles of the flaps are mounted; and this frame is guided in its movements by a stationary horizontal rod above, on which it slides.

In order to render the movements of the whole smooth

and regular, the piston rod is connected by a sweep rod and crank pin to the side of a fly-wheel.

The Patentee says that he does not intend to claim any parts of the steam engine, but he claims "the improved machinery."—[*Inrolled in the Inrolment Office, February,* 1835.]

To FREDERICK JOSEPH BURNETT, *of St. Mary at Hill, in the city of London, ship insurance agent, and* HIPPOLYTE FRANCOIS MARQUIS DE BOUFFET MONTAUBAN, *colonel of cavalry, now residing in Sloane-street, Chelsea, in the county of Middlesex, for certain improvements in the manufacture of soap, being a communication from a foreigner residing abroad.*—[Sealed 4th July, 1838.]

THE object of this invention is to make or manufacture soap from refuse animal matters, which have not hitherto been used for such purpose, whereby such matters which have heretofore been thrown aside for manure, or put to little use, are made available to a better and more useful purpose; and consists in making or manufacturing soap from the intestines of animals and other gelatinous or fibrinous parts of animals, and also of fish, which have not before been used for such purposes. Such intestines or other gelatinous or fibrinous materials being subject to processes whereby caustic alkali is made to act upon the said materials, and produce saponification, and convert the same into soap.

And previous to describing the mode, manner, or method and processes of treating or operating upon such refuse animal substances, we will first state that we are well aware that all animal and vegetable oily and fatty materials have

long been employed in the manufacture of soap; and also, that caustic alkali has been used in such manufacture, for producing saponification, and converting the said fatty materials into soap; and, therefore, we hereby disclaim the use of all fatty or oily matters extracted from animal or vegetable bodies in the process of manufacturing soap, saving and except when used in conjunction with the refuse animal, gelatinous, and fibrinous materials, as hereinafter described; that is to say, when such animal or vegetable fatty matters are used in small proportions, mixed with the said refuse animal matter after being acted upon by the alkali, for the purpose of producing a better quality of soap than the said refuse animal matters would make when used by themselves.

And we will now proceed to describe the process, manner, or method of treating the said animal, gelatinous, or fibrinous matters, and converting the same into soap, stating the process which we have employed, and found to answer well for this purpose when treating upon the intestines of animals. That is to say, the intestines, after being well washed or cleansed, are placed in proper vessels, and immersed in a ley of caustic soda or alkali, in order to prevent their decomposition until they are wanted for use. The quantity of this ley, in proportion to the mass of intestines, must vary according to circumstances: we have found seven or eight per cent. of alkali, to the quantity of materials under operation, to answer well. The animal matters are to remain in the tubs or vessels seven or eight days, or until the alkali solution is absorbed, and a partial saponification has commenced. When the intestines are required for use, they are to be carefully washed, and well drained or partially dried on hurdles or nets, after the manner that feltmongers treat their materials; after which, the animal matters are to be placed in a copper or other suitable vessel

containing a solution of caustic alkali. This caustic ley is to be made warm during the time required to produce the entire saponification of the materials: the fire used in this operation or process should be slow, if applied direct to the copper or other vessel, as the materials ought never to be allowed to boil. This is easily prevented, after a few trials have been made and the proper precautions used, which practice will show; but if the copper or other vessel containing the materials is heated by means of steam or hot water, in the way it is commonly applied in various operations and manufactures, then these precautions will not be required, as the alkaline ley will never boil if the apparatus is properly arranged and constructed. After the saponification has taken place, the soap is to be poured into moulds to give the required shape of the cakes, and allowed to cool, and, when hard, is ready for use.

We should here observe, that this soap contains, in its primitive matters, a large proportion of water, and, therefore, dries with greater difficulty than common soap. If it is desired to obtain a hard soap, it is necessary to add into the copper or other vessel, after a few hours of the above operations, a sufficient quantity of barras or gallipot, or other resinous matter, which will give it solidity. It is difficult to indicate or name the precise quantity of materials to be used in these processes, because the intestines have more or less fatty substances or materials commingled with them; but a few days' practice and experiments will show this better than any stated proportion. When it is wished to obtain a whiter soap, it is necessary, as soon as the saponification is finished (and no gallipot has been used), to mix in the copper a proper quantity of chlorine of soda or other bleaching matters, the whole mass of materials being well agitated or stirred during a proper time, and the result will be as desired.

It is important to notice that the ley or solution of caustic alkali is incorporated with the animal matters, and therefore a superabundance of water cannot be drawn or pressed out of the materials after saponification, as is the case in the ordinary manufacture of soap from fatty materials; and we would further remark, that the saponification of the gelatinous or fibrinous matters is a rather delicate process, and, therefore, requires attention. The difference of temperature or climate, and the proportion of fatty matters which the intestines contain, ought to determine, in some degree, the proportion of alkali used, and the modification of the dose or the ley, all of which will be readily suggested by any practical soap manufacturer or chemist.

We should here mention, that in order to introduce the barras or gallipot, or other resinous matters into the soap, it is necessary to dissolve it in the ley or alkaline solution, or in the fatty materials, to be afterwards incorporated with the soap when it is required to produce a better quality. We have named the above substances because they, being of a whitish hue, will give less colour to the soap than common resin; but if the colour of the soap is not material, then resin may be used to harden it.

Having now described the process and manner or method of operating and treating the refuse animal materials in producing the effect of this invention or discovery, we would remark that the same applies to all gelatinous and fibrinous animal matters not hitherto used in soap-making, the intestines, refuse pieces of skin, sinews, muscles, fleshy or fibrinous parts, horns, hoofs, all kinds of fish and gelatinous animal matters which cannot be put to a better purpose; the only difference of treatment being, that these different matters will require different proportions of the alkaline solution and different periods of ope-

ration, all of which will be found by practice when treating these matters, as above described.

And, in conclusion, we would remark that the caustic alkali solution or ley above named, in both the first and second processes, may be formed with water and the common soda of commerce, pearl ashes, or barilla, caustic lime, or a mixture of all or some of these alkalies; therefore, we do not mean or intend to confine ourselves to alkali in any particular state, or to any particular proportion thereof, nor to any particular time the materials are to be kept under operation, as these must vary according to the quality of the materials to be operated upon: remarking that these processes, manner or methods of treating the above-named gelatinous or fibrinous matters, do not, nor are they intended to apply to the making of soap from animal, fatty, or oily matters, as the same is not at all applicable to the making of soap from such materials alone; and when such fatty matters are added thereto, it is only to produce a soap of better quality or appearance than can be made by the gelatinous and fibrous matters alone.

And, finally, we would state, that what we claim under the above in part recited Letters Patent, is the making or manufacturing of soap with the above-mentioned refuse animal, gelatinous, and fibrinous matters, by treating or operating upon them, and producing saponification therein by means of the caustic alkali leys or solution, in the manner or method above set forth and described.—[*Inrolled in the Rolls Chapel Office, January,* 1839.]

Specification drawn by Messrs. Newton and Berry.

To Edward Heard, *of Bateman's-buildings, Soho-square, in the county of Middlesex, manufacturing chemist, for his invention of certain improvements in oxydizing lead, and converting the same into pigments, or white and red lead, and manufacturing part of the products arising from these processes into soda.*—[Sealed 1st August, 1838.]

The Patentee describes his invention in the following manner:—I take any known weight of lead and melt it in a reverberatory furnace: to the melted lead I add about half its weight of a salt called nitrate of soda, throwing in small quantities at a time, and stirring it well in order to mix it with the fused metal. When the whole of the salt is thus put into the furnace, it is kept continually stirred until the lead entirely loses its lustre and metallic appearance, which takes place by exposure to a low red heat, in the course of a few hours, and becomes converted into a protoxide of lead resembling, in colour, litharge.

When it has attained this state, the charge is withdrawn from the furnace and cast in moulds to consolidate, or spread on a clean stone floor to get cold.

It is next ground to a very fine powder, and if intended for the manufacture of white lead, it is put into a large vat close covered, and mixed with water to about the consistence of thick cream. Into this mass a current of carbonic acid gas is directed, and agitation kept up until the protoxide of lead is converted into carbonate of lead.

This should be well washed, and the saline solutions mixed together and evaporated to dryness. The salts thus obtained, consisting of a mixture of sub-carbonate and nitrate of soda, may be used again two or three times successively when thus recovered with fresh portions of lead, taking care that the metal employed is about double the weight of the saline matter in each charge.

When the whole of the nitrate of soda is decomposed by these successive operations, it is lastly conveyed into an alkali furnace, and there finished with carbonaceous matter; the alkaline salt is then lixiviated, and the solutions mixed and evaporated to dryness, or brought to such a specific gravity as will, under proper circumstances, cause it to form crystals of carbonate of soda, according to the views of the operator: thus white lead and carbonate of soda are produced.

When the object is to manufacture *red lead*, the protoxide of lead above mentioned, as being produced by the first process of oxydation, when taken out of the furnace and cold, is ground fine and put into a vat, where it is repeatedly washed until all saline matter is separated; this latter being reserved for future operations: the protoxide of lead thus purified, is then removed into a red lead furnace, such as are in common use, and there finished in the usual manner.—[*Inrolled in the Rolls Chapel Office, February*, 1839.]

To JOSEPH PRICE, *of the parish of Gateshead, in the county of Durham, flint glass manufacturer, for his invention of certain improvements in constructing and adapting boilers for marine, stationary, and locomotive engines, and in adapting and applying boilers to steam vessels.*—[Sealed 26th July, 1838.]

THE objects of my invention of certain improvements in constructing and adapting boilers for marine, stationary, and locomotive engines, and in adapting and applying boilers to steam vessels, are, first, to arrange and construct steam boilers or generators, so as to obtain the best or most economical effect of the heat arising from the combustion of

fuel; also to prevent the flues within the boiler getting stopped up or obstructed by the deposit of dust or soot therein; and, secondly, to construct, adapt, and apply boilers to steam vessels, in such manner as to allow of better or more free access to all parts of such boilers, and more particularly the bottoms thereof, which cannot be obtained in the ordinary manner of constructing and adapting marine boilers, and also to allow or provide for more room in the vessel for the stowage of fuel.

The first of these objects I obtain by an improved arrangement or construction of the parts of steam boilers or generators, in which the fire boxes or furnaces are placed under the boiler, and not formed wholly within it as in ordinary constructions, there being a water chamber on each side of the fire forming the sides of the furnace. The boiler has long cylindrical, or oval, or any other shaped flues, passing and re-passing throughout it to the chimney: I prefer cylindrical, as they are not so likely to collapse as other shapes: such flues being furnished with deposit chambers at each end of the boiler, or at the parts where the flues return; these chambers being for the purpose of receiving the dust, soot, or ashes, which may be carried by the draught from the furnace, and would otherwise settle on or adhere to the sides of the flues, and obstruct the passages, or pass up the chimney, either of which it is desirable to avoid. The ends of the flues or chambers are furnished with covers or doors, properly secured, and capable of being removed to allow of the deposit being taken away; and I attain the second object of my invention by constructing, adapting, and applying the boilers to steam vessels, in such a manner as to enable me to combine all the above advantages, such boilers being placed much higher in the vessel (that is, at a greater distance from the keel or bottom) than usual, and are supported by pillars or framework, so that easy

access can be had to all parts thereof; and the boiler may be covered with an outer casing, to prevent radiation of heat, if thought desirable. By thus adapting and applying my improved boiler, a freer draught will be obtained, and, at the same time, space for stowage of coals will be provided under the boiler, as well as at the sides or other parts of the vessel; and the danger of the vessel foundering at sea, or the fires being extinguished in consequence of leakage, will be lessened. I will now refer to the accompanying drawings, the better to illustrate my invention.

Plate III., fig. 1, is a longitudinal section taken vertically through one of my improved arrangements or constructions of boilers, having two fire-places and sets of flues, which may be used either for marine or stationary engines; fig. 2, is a front elevation of the same; fig. 3, is a horizontal section taken at the top part of the boiler above the flues, and showing the arrangement thereof; and fig. 4, is a transverse section taken vertically through the boiler and all the flues; A, A, is the outer casing of the boiler: B, B, are tubes forming the bottom flues, which commence at the back part of the fire-box or furnace C, and proceed along the boiler to the end thereof, where the ends of the flues are covered by plates or doors *a, a*, secured by bolts and nuts on the outside. Near the ends of the flues B, (say about two feet from the covers) they are turned upwards by curved or elbow pieces marked D, and returned to the front part of the boiler by the flues E, the ends of which are secured in a similar manner. Near to the front end of the boiler, the flues are again turned by other elbow pieces D*, into the upper flues G, which pass off into the chimney H; I, I, are the fire-bars of the furnace; K, K, are cocks affixed to the bottom of the boiler to blow off the sediment or water when required; L, the common safety valve; M, another safety valve hereinafter described; N, the man-hole; O, the

steam-pipe leading to the engine; P, P, are the continuations of the flues past the elbow bends D, which parts from the receiving chambers for the deposit of the dust or soot arising from the furnace, which is carried therein and deposited by the draught, and thus prevent the flues being choked up or interrupted, and whereby the boiler may be worked for a longer time than usual, without the necessity of sweeping the flues; fig. 3, shows how the four upper flues G, enter the chimney H, the flues E, being underneath them; and the flues B, are in a like manner placed below those marked E; the bars *b*, *b*, placed across the boiler, are the stays or supporters of the flues, and at the same time serve to strengthen the boiler. The section, fig. 4, is taken through the boiler at the back of the furnace; I, I, are the fire-bars.

Fig. 2, shows the front of the boiler with the covers or doors *a*, of the deposit chambers, which are lettered to correspond with their flues; Q, Q, are the fire-doors; R, the gauge-cocks; S, the steam-cocks; T, the side water chambers of the furnace; U, U, are cocks at the bottom of the side chambers, and M, the second safety valve.

Figs. 5, 6, 7, and 8, are representations of a boiler adapted for locomotive purposes. Fig. 5, is a horizontal section of one of my improved arrangements and constructions of steam boilers as adapted for locomotive steam engines, the top being removed to exhibit the uppermost flues; P, P, are deposit chambers for the reception of the dust from the furnace; the bars *b*, *b*, are the supports of the flues.

Fig. 6, is a longitudinal vertical sectiou of the same boiler, showing the interior and the fire-box or furnace, and the arrangement of the flue, there being only one in this instance, which may vary in diameter according to the size of the boiler. The flue B, commences on the left hand side of the back part of the fire-box or furnace (see the

transverse section fig. 7,) and is carried along the side of the boiler (about four inches from the bottom) to the end of the boiler, where it is covered by a plate or door *a*, secured, as before mentioned, in the marine and stationary engine boiler. At about nine or twelve inches from the end, the flue is turned in a horizontal direction by the elbow parts marked V, (see fig. 5,) and is again carried along the opposite side of the boiler at about the same elevation from the bottom, until it comes within about one and a half or two feet of the fire-box, when the flue rises in an angular direction, as shown in fig. 6, and then passes over the fire-box to the front of the boiler, where its end is secured, as before mentioned. About nine or twelve inches from this end, the flue is again turned horizontally by the elbow piece W, into the flue E, and is carried along the opposite side, continued along to the back of the boiler, and is again turned to the opposite side by another elbow piece V, and proceeds along by the flue until it rises and enters the chimney H; C, is the fire-box or furnace. Fig. 7, shows the commencement of the flue B, at the back of the fire-box, and the situation of the flues E, E*, above the fire-box: fig. 8, shows the front of the boiler; Q, is the fire-door, which is formed by two half-doors lapping over each other; *a*, *a*, are the covers or plates; on the ends of the flues are deposit chambers; there are two gauge-cocks, and three steam-cocks, and also a cock at the lower corners of the side water chambers T, for drawing off the water or sediment.

The flues occupying the interior of these improved boilers should at all times be covered with water, leaving sufficient steam room. I prefer the flues for marine or stationary engine boilers, not to be less than about twelve or fourteen inches in diameter, and they may be made of wrought iron, copper, or other metal. Flues of a less diameter, and more

in number, may be employed; but they are more liable to choke, and no advantage will be gained. If the boiler is a long one, say thirty feet, then the flues may be reduced to two tiers, instead of three, which would allow more steam and water room; but by such arrangement, four deposit chambers for receiving the dust from the furnace will be lost.

A damper should be placed at the bottom of the chimney, whereby the draught may be regulated. The draught is increased by the length of the flues, and the formation and situation of the fire-box or furnace.

If pipes are fastened to the blow-off cocks at the bottom parts of the boiler, the water or sediment will be forced overboard by the pressure of the steam in the boiler, and the blow-off pipes may be used to cool or put out ignited ashes when required. The water feed pipes may be placed in the boiler where most convenient, and a float may also be adapted to show the height of water in the boiler if desired. Two safety valves should be used, one being weighted to the highest range of pressure intended to be allowed in the boiler, and secured from the interference of the working engineer; and the other valve may be of the common kind, and its weight left to the judgment of the engineer; the former I prefer to be constructed in the form of a ball, made of brass, and loaded with shot, and placed in a cup-seat; which ball rises from its seat, and allows the steam to escape so soon as it gets to within a little of the safety pressure. This valve being covered with a cap, secured with nuts passed within the boiler, it cannot be removed or over-weighted, without emptying and cooling the boiler; consequently, it is beyond the reach of the working engineer, whilst he has his own valve to regulate the steam as he likes, until it comes to the pressure of the ball valve.

I consider the properly placing of the boiler in a steam vessel of great importance, and I, therefore, adapt my improved arrangement and construction of boilers to the vessel in the following manner :—

The boiler is to be fixed on an elevated platform of iron, supported by metal columns or framework, so as to enable the engineer to have free access to examine all its parts to cleanse or repair when required. Another advantage arising from the boiler being placed high in the vessel is, that a better draught will be obtained, and less danger of the engine stopping, should the vessel spring a leak. Should any incrustation form on the outside of the boiler from leakage, it can be readily removed and the boiler examined. The danger of the flues collapsing is avoided by their form, and the manner in which the furnace or fire-box is constructed, it being situated in the under part of the front of the boiler; the top of the furnace being formed by the under side of the boiler, and in as near a semicircle as the second tier of flues will allow. This boiler will answer equally well for stationary engines, or for marine purposes, and will not require setting in brick or stonework, except for its supports, which may be of metal, if thought desirable.

In steamers of war, the boilers may be protected from injury from cannon-shot, by a space or chamber placed between the sides of the vessel and the boiler; which space or chamber is to be filled with coals, previous to going into action, which will tend greatly to prevent the effects of shot.

The locomotive steam-engine boiler may be of any capacity, according to the size or power of the engine; and the top, back part, and sides of the fire-box should be stronger than the other parts. The water-way round the fire-box ought to be from three to four inches broad.

Should the flues at any time require repairing, the back

or part of the back of the boiler can be taken off. The flues at the ends or elbow parts are secured by screw-nuts and flanges or rivets. The chambers at the ends of the flues can be swept or raked out on taking off the plates or doors *a*, at either end of the boiler.

Having now described and ascertained the nature of my invention, and the manner of carrying the same into effect, I wish it to be understood that I claim as my invention, secured to me under the above in part recited Letters Patent, the improved arrangement and construction of steam boilers or generators, as above described and set forth, with its furnaces or fire-box and flues, furnished with chambers or repositories for the deposit of the dust or soot carried from the fire by the draught; and also the improved mode in which they are adapted and applied to steam vessels, so that free access will be allowed to all parts of the boiler, and, at the same time, more room afforded for stowage of fuel than in the ordinary method of adapting boilers to steam vessels.—[*Inrolled in the Rolls Chapel Office, January,* 1839.]

Specification drawn by Messrs. Newton and Berry.

[We have been favoured by the Patentee with the following particulars of some experiments made by him, to show the value and efficiency of his invention. He says: I have a boiler of eighteen horses power at this present time in use, on this principle, and conceive it the safest, best, and cheapest, in regard to fuel, of any yet invented: any description of coal will answer, but I always use small coal; and the gross consumption per week, on an average of three weeks, is 65 cwt. 1 qr. 14 lbs., the week's work (adding one hour for heating the water on the Monday morning) is seventy-five hours; from which deduct nine for the breakfast and dinner hours, leaves sixty-six hours as the time the engine is at work during the week; for the stoppages and firing at night, fifteen per cent. is generally allowed; there-

fore fifty-six cwt. will be the consumption of small coal during the time the engine is at work, or 5·27 per horse power per hour, yet the gross weekly consumption of coals cost only ten shillings, waterage included. On making a trial with four hundred weight of duff coal (the very smallest of coals, the largest scarce the size of a pea), in four hours 418 gallons of water were evaporated, equal to 16·760 cubic feet per hour; thus making the duty of a pound of duff coals ·935 of a gallon of water.

A boiler, constructed on the principle of my patent, if kept thoroughly clean, will last for twenty years without repairs, except all above the grate room and about half the length of the bottom flues, which should be renewed, if found necessary, every eighteen months or two years, if made of wrought iron.

A boiler of this construction does not consume above one half the quantity of coal that any other of similar dimensions does, nor will more than half the number of stokers be required; also the heat in the engine room will be but trifling, two firing holes being sufficient for the largest boiler.—Ed.]

To JOSEPH WINTER, *of Fountain-court, Cheapside, in the city of London, glover, for his invention of improvements in painting, printing, or otherwise ornamenting the surfaces of leather, silk, cotton, or linen; which improvements are particularly applicable to the manufacture of gloves, stockings, and such like articles.*—[Sealed 14th June, 1838.]

MY improvements in painting, printing, or otherwise ornamenting the surface of leather, silk, cotton, or linen, which improvements are particularly applicable to the manufacture of gloves, stockings, and such other like articles, consist in the following features of novelty as applied to those objects. Firstly, a mode of preparing skins of leather in order to render their surfaces more fit to receive or retain printed,

stained, or painted ornaments, than the ordinary preparations of leather are capable of. Secondly, the mixing of colours, or colouring matters, with elastic gum, for the purpose of printing or painting upon the surface of leather and other elastic fabrics, for the manufacture of gloves, purses, bags, stockings, shoes, and such like articles. Thirdly, a means of extracting portions of the ground colour from printed or stained leather, for the production of devices, patterns, or designs of various forms, particularly in imitation of lace, net, or fretwork; and, fourthly, a mode of preserving embossed or raised figures or devices on gloves, shoes, purses, bags, and other articles of those kinds.

With respect to preparing leather for printing, I would first mention, that in the ordinary preparations of kid and other elastic leathers suited for the manufacture of gloves, purses, bags, ladies' shoes, and some other articles, a solution of alum and common salt is employed with the yolks of eggs; and that, in order to extract the common salt from the skin, previously to staining, printing, or painting its surface, the skin is required to be washed several times, which washing tends greatly to harden it, and to disqualify its surface to receive and retain the staining, printing, or painting colour in a perfect state. In my improved process, therefore, I dispense with the use of common salt, and employ in its stead Epsom salts, with a small portion of sal ammoniac in conjunction with the alum and yolks of eggs, in the proportion of about 3 lb. of alum to 1 lb. of Epsom salts and 4 oz. of sal ammoniac in twenty yolks of eggs. These are all to be beaten up together in a suitable vessel, and when perfectly mixed, the skins or pelts are to be thrown into the mixture, and beaten or trodden on by the feet of the workmen, or by any other suitable mechanical means.

When the pelts immersed in the solution have absorbed all the liquid they are capable of taking up, they are to be removed and dried in the usual way, and are then fit to be stained, printed, or painted upon, being then in a much better condition to receive and retain the colouring matters, than if they had been treated according to the ordinary operation in which common salt is used.

I may add, that if leather prepared in the common way is to be stained or printed upon, I find it very considerably improved, if steeped in a solution of Epsom salts and sal ammoniac, with a small quantity of alum and yolks of eggs, in the way above described; but I never found that any leather received and retained the stain or printing process so well, if common salt had been used in its preparation.

In preparing colouring matters for printing or painting upon the surfaces of leather, silk, cotton, or linen, the dry colour is first wound up in spirits, and then a small quantity of caoutchouc (India rubber) in a fluid state is mixed with the colour by way of gum. This preparation will cause the colour to take more firm hold of the material upon which it is laid, than any of the ordinary colours or inks used for printing; and beside, the elasticity of the gum will allow the goods which have been printed or painted with such prepared colour to expand, without breaking any parts of the device, or allowing the colours to peel off.

Leather which has been stained with one colour all over the surface, may have devices or patterns worked upon it, by extracting portions of that colour by chemical means. This operation will, of course, depend upon the composition of the colour with which the surface of the skin is tinted, and a chemist will perfectly understand how to manage it.

The way in which I proceed is this:—After having stained the surface of the skin with a suitable colour, I charge the face of the block type, or other article by which the pattern is to be given, with a material containing acid. This acid, when applied to the stained ground of the leather, will partially discharge or change those parts of the ground tint so acted upon, and thereby produce a contrast of colour between the forms thus stamped upon it, and the original or ground tint.

One mode which I adopt, is by dipping a sheet of lace net in a solution of acid, and after spreading it out flat whilst wet with the acid, pressing by means of a roller or other apparatus the sheet of lace upon the face of the tinted skin, when the acid which exudes from the threads of the lace net under pressure will act upon the tinted surface of the skin, and discharge or change its colour in the form of the meshes of the net spread over the skin.

It is not necessary that I should state what are proper materials for producing the stained tints of the skins intended to be so operated upon, as that must depend upon the required colours, and is a matter well known to chemical printers; so also in the kinds of acids and acidulous compounds to be used; and the strength of the acids can only be so far defined, as to say that they must not be used of such strengths as will injure the material upon which they are to act, or be applied in such profusion as to spread beyond the limits or edges of the pattern or figure intended to be produced upon the skin.

For the backs of gloves, the upper leathers of ladies' shoes, the outsides of purses and bags, and some other articles which may be ornamented with embossed devices, in order to preserve the embossed ornaments, I introduce into the hollow parts of the devices, at the back of the ma-

terial, a thick solution of caoutchouc (India rubber), just sufficient to fill up the hollows of the embossed devices, and then scrape or spread the elastic gum smooth and even at the back; and before the gum is completely set, I cover the back part with a piece of thin silk, or other thin non-elastic substance, which, by adhering to the gum, keeps the India rubber as a pad, distending and supporting the embossed device, and preserving it in relief when the article is distended on the hand or foot of the wearer, or is subjected to stretching or pressure by any other cause.

Lastly, I desire it to be understood that I do not intend, under the above recited Letters Patent, to claim as my invention the painting, printing, or ornamenting of leather, or any other fabric, for the manufacture of gloves and other articles; but I do claim the improvements set out under the four heads above stated; that is to say, I claim, first, the improved method of preparing skins or pelts for staining, printing, or painting upon, by the means and materials above set out. Secondly, the employment of caoutchouc (India rubber) as an elastic gum, mixed with colouring matters, for printing or painting leather and other elastic articles. Thirdly, the mode of producing patterns or devices on leather, by extracting parts or portions of the ground tint by acids; and, fourthly, the mode of protecting or preserving embossed devices by filling the backs of such embossed parts of the goods with paddings of caoutchouc.—[*Inrolled in the Rolls Chapel Office, December,* 1838.]

Specification drawn by Messrs. Newton and Berry.

To JOHN DANFORTH GREENWOOD *and* RICHARD WYNN KEENE, *of the Belvidere-road, Lambeth, in the county of Surrey, manufacturers, for their invention of an improvement in the manufacture of cement, and in the application of cements and other earthy substances to the purpose of producing ornamental surfaces.*—[Sealed 27th February, 1838.]

THIS invention is divided into two parts, and consists, firstly, of an improved method of producing a cement from gypsum or sulphate of lime, or any other calcareous substances; and secondly, in a method of producing inlaid patterns of such or other cements or earthy substances.

The method pursued by the Patentees in carrying their invention into effect, is described in the specification somewhat in the following manner:—They take a quantity of gypsum or sulphate of lime, in lumps, or the state in which it is quarried, and, after evaporating the waters of crystallization contained therein, in the manner that is generally employed in the manufacture of plaster of Paris, the gypsum is placed in a large tank, that has been previously charged with several gallons of water in which a quantity of alum is dissolved, in the proportions of about one pound of alum to each gallon of water: the gypsum must be allowed to remain in this solution until it has absorbed as much of the liquid as it possibly can. The stone thus saturated is then to be removed from the tank and suffered to dry in the open air, after which it is to be calcined at a red heat, in a furnace, oven, or kiln, for the purpose of fixing the alum. The stone must then be reduced to powder, by any convenient apparatus, and, if thought desirable, it may be sifted, when it will be ready for use.

If a white cement, of great purity, be required for any particular purpose, the cleanest and best quality of gypsum

or sulphate of lime should be selected; and instead of saturating it with a solution of the alum of commerce, as before described, the Patentees use either the clarified or concentrated aluminous mother liquor of the required strength, and which they find to answer the purpose of their invention more effectually, owing to the absence of any alkali or other extraneous matters.

For a coloured cement, half a pound of the alum of commerce is dissolved with a quarter of a pound of copperas or sulphate of iron in one gallon of water, and, excepting so far as regards the component parts of the mixture, above described, the manufacture of the coloured cement is essentially the same as the process described for making the white cement, and the result will be a pale red cement. Other calcareous or gypseous substances may also be calcined in combination with alum, together with one or more of the sulphates or other salts of minerals or earths, either separately or in combination with each other, so as to form other cements of different colours and strengths.

It is here observed, that in the process of calcining these mixtures, if the heat is continued too long, a smell of sulphur will be produced; any workman, however, will, with a little practice, soon become fully acquainted with the process.

As it is found that gypsum and other calcareous earths vary in their strength, it is desirable that they should be tested in small samples with different qualities or strengths of alum, or salts of other earths or minerals, so as to ascertain the best proportions to mix them for any required cement: this, however, will only be necessary when the workman is commencing to work with any new material or substance, the strength of which he is not fully acquainted with.

The cement, when employed as a stucco, either exter-

nally or internally, is used in exactly the same manner as any other plaster or cement at present in use; and if it should be found necessary to use grit of any kind, scoria, iron slag, or other vitrified mass when reduced to a sharp grit, in any convenient manner, will be found to answer the purpose very well, and must be used in sufficient quantities to cause the cement to work freely. When the surface is required to be polished, the last coat should be of the cement alone, and generally it will be found that the trowel will give a sufficient polish; a superior surface, however, may be given by pursuing the methods used in polishing scagliola.

The Patentees now proceed to describe the second part of their invention, viz. the method of applying the before-mentioned cement for the purpose of producing surfaces with inlaid patterns. This is done by taking tempered clay, wax, or any other suitable material, and beating it out to the thickness of the intended inlaying; after which it is placed on a perfectly smooth surface, such as polished slate, glass, marble, or other suitable material. The pattern intended to be inlaid is then to be drawn upon paper, after which it is transferred or traced on to the surface of the clay or wax; it is then cut out, and the edges of the pattern thus formed are slightly bevilled or sloped. A cast must now be made in plaster, sulphur, or wax, and the mould thus obtained being first greased or soaped, the cement, mixed with water to a proper consistency, is to be poured or rubbed in, and in about four-and-twenty hours, the cast will be sufficiently hard to come off with the pattern impressed upon it. This cast is then filled up with cement of any colour required, and when dry, the whole must be rubbed down to a smooth surface, and polished in the ordinary manner.

The Patentees conclude their specification by stating, that although they have described the best methods that

they are acquainted with of carrying out their invention, they do not intend to confine themselves to the precise methods and quantities mentioned, provided the principles of the invention are retained, as the cement may be mixed with other materials besides those mentioned in the specification; and the invention does not relate to the mode of mixing and using the cement, but in the mode of making the cement itself. It is then stated that the claim of invention applies, firstly, to the mode of making cement from gypsum or sulphate of lime, or other calcareous earth, by calcining them in combination with alum or other earths, and metallic salts, as above explained; and secondly, the mode herein described of producing ornamental inlaid surfaces.—[*Inrolled in the Inrolment Office, August,* 1838.]

SCIENTIFIC ADJUDICATION.

PRIVY COUNCIL.

It has been currently reported, that the Privy Council had proceeded so far under Section II. of Lord Brougham's Act respecting the establishment of such patents as have been proved not to be the original invention of the patentee, although he believed himself to be the inventor, as to confirm a patent granted to Baron Heurteloupe, May 22, 1834, for improvements in certain parts of certain descriptions of fire-arms, notwithstanding that a description of the invention, the subject of such patent, had been previously published in England in some book, although not in general use. In consequence of this report, we have taken some pains to ascertain exactly the facts of the case, as such a very important decision would materially benefit many patentees. But the course adopted by the Privy Council, previous to their confirming such patent, appears to us to give a very different impression of that case to what it might be considered to have been

from such a statement. We have, therefore, thought it advisable to lay before our readers what were the real facts, and what the Privy Council did on that occasion.

It appears that the improvement in fire-arms for which Baron Heurteloupe obtained his patent, included a mode of igniting the charge by placing detonating powder in copper tubes; but after his patent was obtained, he discovered that, in the year 1832, the date of his patent, a French work, entitled "Description des Machines et proce des specifies dans le Brevets d'Inventions dont la durée est expirée publié d'apres les ordres de son Excellencé le Ministre de l'Interieur, par M. Christian, Directeur du Conservatoire Royal des Arts et Metiers, tome xiv.," had been deposited in the British Museum, which contained the description of a patent granted in France to a native for improvements in fire-arms, in which a similar mode of exploding the charge was described; the difference being, that the Frenchman used straw for his tubes, whereas the Baron used small tubes made of metal.

The Baron seems to have been advised that the depositing of this French work in the British Museum, in 1832, was a sufficient publication of this invention to the people of England to endanger the novelty of his subsequent patent. He, therefore, applied to the Privy Council, under the section above recited, to confirm his patent; and the Privy Council, after requiring evidence to satisfy them that such invention had never been used in England, or published previous to the date of the said patent, in any other manner than by this French book, then directed that notice should be sent to the Frenchman in Paris whose invention was described in that book, informing him that Baron Heurteloupe was seeking such confirmation of his patent, and stating the day when the case would come on. This was done, and, when that day arrived, no person appearing to oppose the application, and proof being given of such a notice having been sent, the patent was confirmed.

Now, it is evident from this statement, that the Privy Council did not confirm a patent for an invention which had been pre-

viously published in any book printed in England, as was reported; and instead of their having extended an additional security to patentees, they appear to us to have had a different feeling, or else why should they have directed notice to have been sent to a foreigner residing abroad of such an application having been made to them? If it is to be admitted that a patent is not good because some foreign book which may have been previously brought to this country contains a description of a similar invention, few patentees will know when they are secure against the charge of want of novelty; and yet we must infer that this was the opinion of the Privy Council in the Baron's case.

The test as to novelty which has hitherto been applied is, whether the invention *has been publicly sold, used, or printed in a book published in this country?* And surely, the depositing of a book printed abroad in a foreign language, in one of our libraries, can never be considered as a publication to all the English subjects. If this be so, how many books must an inventor consult before he incurs the expense of a patent? It is only of late years that our scientific societies in England have exchanged their transactions with similar societies in France, Germany, Russia, &c. &c.; and many of such foreign transactions are never to be found in this country, except in the libraries of the Royal Society, the Astronomical, the Geological, &c. &c. Is it to be supposed that a man who chooses to infringe against an English patent is entitled to rummage through all these books, and to upset a patent, if he happens to find a foreign work that has been thrown aside in one of the libraries of these societies, containing a description of a similar invention, written in a language that few of the ordinary mechanics in this country can understand? This, we know, is the interpretation of the Patent Laws in all the continental states; but not so in Great Britain, as respects the publication in any foreign language. Indeed, it is a question yet undecided by any legal authority, whether the production of a description of our inventions printed in English and published in America, would affect the rights of a patentee of the same sub-

ject subsequently patented in these kingdoms. If the name of a bookseller in Great Britain was affixed to the American book, that would amount to a publication here; but if only foreign booksellers were named, our opinion is, that the law would not consider such invention to have been published in these kingdoms.

List of Patents

Granted by the French Government from the 1st of January to the 31st March, 1838.

(Continued from page 420, vol. xiii.)

To François Julien Noel, of Paris, for improvements in the art of turning wood, &c.

— George Goodlet, of London, for a method of communicating caloric, for distillation and such like purposes.

— Charles Duval, of Paris, for the application of white and coloured substances, upon glass and other solid bodies.

— Antoine Stanislas Casimir Chapelle, of Paris, for a filtering apparatus.

— Moses Poole, of London, for improvements in stoves.

— Payen and Buran, of Paris, for a composition of grease for carriage wheels.

— Jean Jacques Werner, of Paris, for a system of navigation upon rivers with or against the current.

— Robert Passenger, of London, for new, economical, smoke-consuming stoves, fit to produce steam.

—Edme. Augustin Chameroy, of Paris, for the employment of mineral and vegetable bitumen, combined with divers substances, and laminated with wood.

— François Marie Mignard Billinge and Henry Mignard, son, of Paris, for a new pipe.

— Achille and Alexandre Montgolfier, brothers, of Paris, for making paper and pasteboard with wood shavings.

To André Blanchet, of Lyons, for improvements in the fabrication of silks.

— Joseph Dangle, of Lyons, for improvements in umbrellas.

— Jean Bird, of Birmingham, for a lamp for burning gas.

— Jean Pierre Regnier, Eugène Grandhomme, Eugène Olvi, and Alexandre Dreyfries, for a bitumen, for all kinds of paving.

— Robert Bell, of Edinburgh, for a new apparatus for heating and evaporating liquids.

— Jean François Robert, of Paris, for a method of colouring glass.

— Frederic Lesnard, of St. Malo, for a bridge upon a new system.

— Jean Nicolas Alexandre Rigaux, for a mechanism applicable to a stocking frame.

— Thomas Bell, of Newcastle, for a means of making sulphuric acid.

— Thomas Bradshaw Whitfield, of London, for a new mechanism with rectilinear motions, applicable to mechanical lamps.

— Menzel and Co., of Cologne, for a machine to make leaden and pewter tubes.

— Jean Gabriel Fillon, of Paris, for a system of lever called *Fillon lever.*

— Jean Baptiste Muard, of Joux-la-ville, for a new construction of keyed instruments.

— Pierre Isidore Rouen, of Paris, for improvements in lamps.

— Richard Joshua Iremonger, of London, for an improved method of suspending the bodies of carriages.

— Denis Etienne Tourasse, Jean Baptiste Pacote, and Joseph Bernard Pacote, of Cirey, for improvements in the manufacture of earthenware, and all such materials.

— Jean Fiechter, of Paris, for a machine to print cottons in all colours.

— Antoine Emmanuel Cesar Chauvin, of Poitiers, for a means of preventing accidents from fire-arms.

List of Patents

Granted in Scotland between 22d February and 23d March, 1839.

To Alexander Borland, of Paisley, for a machine for measuring water and other liquids, and registering the quantity thereof.—23rd February.

— Sir James Caleb Anderson, of Buttevant Castle, county of Cork, for certain improvements in locomotive engines, which are partly applicable to other purposes.—26th February.

— Orlando Jones, of Rotherfield-street, Islington, London, for improvements in the manufacture of starch, and the converting of the refuse arising in and from such manufacture to divers useful purposes.—27th February.

— Frederick C. Mesurier, of New-street, St Peter's Port, Island of Guernsey, for a certain improvement or certain improvements in the manufacture of pumps for raising water or other fluids.—28th February.

— Richard Whytock, of Edinburgh, manufacturer, and George Clink, of the same place, colour-maker, for further improvements in the process and apparatus for the production of regular figures or patterns, in carpets and other fabrics, in relation to which a patent was granted to the said Richard Whytock, on 8th September, 1832, and generally in the mode of producing party colours on yarns of worsted, cotton, silk, and other fibrous substances.—6th March.

— Pierre Armand Lecomte de Fontainemoreau, of Charles-street, City-road, for certain new and improved metallic alloy, to be used in various cases as substitutes for zinc, cast iron, copper, and other metals, being a communication from a foreigner residing abroad.—8th March.

— Benjamin Goodfellow, of Hyde, for certain improvements in metallic pistons.—8th March.

— John Hawkshaw, of Manchester, civil engineer, for certain improvements in mechanism or apparatus applicable to railways, and also to carriages to be used thereon.—8th March.

— John Muir, jun., merchant, Glasgow, for certain improve-

ments in the apparatus connected with the discharging press for conducting, distributing, and applying the discharging liquors and the dyeing liquors.—11th March.

To Thomas Vaux, of Woodford-bridge, county of Essex, land-surveyor, for improvements in tilling and fertilizing land.—13th March.

— Alexander Croll, of Greenwich, chemist, for improvements in the manufacture of gas for the purpose of affording light.—13th March.

— Moses Poole, of Lincoln's-inn, in consequence of a communication made to him by a foreigner residing abroad, for certain improvements in tanning.—13th March.

— Henry Ross, of Leicester, worsted manufacturer, for improvements in machinery for combing and drawing wool and certain descriptions of hair.—13th March.

— James Walton, of Sowerby-bridge, county of York, cloth-dresser, for certain improvements in machinery for making wire cards.—13th March.

— Henry Huntley Mohun, of Regent's-park, London, M.D., for improvements in the composition and manufacture of fuel, and in furnaces for the consumption of such and other kinds of fuel.—13th March.

— Josias Christopher Gamble, of St. Helens, county of Lancaster, manufacturer, for certain improvements in apparatus for the manufacture of sulphate of soda, muriatic acid, and chlorine and chlorides.—13th March.

— James Russell, of Hundsworth, county of Stafford, glass tube manufacturer, assignee of Cornelius Whitehouse, of Wednesbury, in the said county, for an extension of six years from 26th May, 1839, of a patent granted to the said Cornelius Whitehouse, for an invention of certain improvements in manufacturing tubes for gas and other purposes.—15th March.

— Joseph Rayner and Joseph Whitehead Rayner, Coventry, civil engineers, and Samuel Rayner, of Ripley, civil engineer, for divers new and important improvements in machinery for

roving, spinning; and twisting cotton, flax, wool, and other fibrous materials.—15th March.

To John Leigh, of Manchester, surgeon, for an improved mode of obtaining carbonate of lead, commonly called white lead.—18th March.

— Samuel Clegg, of Sidmouth-street, Gray's-inn-road, London, engineer, for a new improvement in valves, and in the combination of them with machinery.—18th March.

— Joseph Bennet, of Turnlee, near Glossop, cotton-spinner, for certain improvements in the machinery for carding, drawing, slubbing, roving, and spinning silk, wool, cotton, worsted, flax, and other fibrous substances, which improvements are also applicable to other useful purposes.—20th March.

— John Robinson, of North Shields, engineer, for a nipping lever, for causing the rotation of wheels, shafts, or cylinders, under certain circumstances.—22nd March.

New Patents
SEALED IN ENGLAND.
1839.

To George Augustus Kollman, of the Friary, St. James's Palace, in the county of Middlesex, professor of music, in pursuance of a report of the Judicial Committee of her Majesty's Privy Council, of an extension of former Letters Patent for the term of seven years, from the 26th February, inst., for his invention of certain improvements in the mechanism and general construction of pianofortes. —Sealed 23d February.

To Charles Louis Stanislas Baron Heurteloupe, of Queen Ann-street, in the county of Middlesex, for his invention of certain improvements in fire-arms, and in the balls to be used therewith.—Sealed 23d February—6 months for inrolment.

To Thomas Pratt, of South Hylton, in the county of Durham, mechanic, for his invention of an improved capstan and winch for purchasing or raising ships' anchors without the application of a messenger, in which there is no fleeting or surging, and for drawing or working of coals and other articles and things out of coal and other mines, and also for the drawing and working on railroads by drawing pulleys with flat or round ropes.—Sealed 23d February—6 months for inrolment.

In pursuance of a report of the Judicial Committee of her Majesty's Privy Council, unto James Russell, of Hundsworth, in the county of Stafford, gas-tube manufacturer, for the term of six years, from the 26th February, inst., being the expiration of the original invention granted to Cornelius Whitehouse, for certain improvements in manufacturing tubes for gas and other purposes, and assigned by him to the said James Russell; in which said extension is contained a proviso that the said James Russell shall secure to the said Cornelius Whitehouse, as such original inventor, the sum of 500*l.* per annum during the said term of six years.—Sealed 26th February.

To Moses Poole, of the Bill Office, Lincoln's-inn, in the county of Middlesex, gentleman, for improvements in constructing and applying boxes to wheels, being a communication from a foreigner residing abroad.—Sealed 28th February—6 months for inrolment.

To Moses Poole, of the Bill Office, Lincoln's-inn, in the county of Middlesex, gentleman, for certain improvements in tanning, being a communication from a foreigner residing abroad.—Sealed 28th February—6 months for inrolment.

To John Leigh, of Manchester, in the county of Lancaster, surgeon, for an improved mode of obtaining carbo-

nate of lead, commonly called white lead.—Sealed 28th February—6 months for inrolment.

To Richard Whytock, of Edinbuogh, in the kingdom of Scotland, manufacturer, and George Clink, of the same place, colour-maker, for their invention of further improvements in the process and apparatus for the production of regular figures or patterns in carpets or other fabrics, in relation to which a patent was granted to the said Richard Whytock, on the 8th of September, 1832, and generally in the mode of producing party colours on yarns, or threads of worsted, cotton, silk, and other fibrous substances.—Sealed 1st March—6 months for inrolment.

To Moritz Platow, of Poland-street, Oxford-street, in the county of Middlesex, engineer, for his invention of improvements in pumps or engines for raising or forcing liquids.—Sealed 6th March—6 months for inrolment.

To John Dickson, of Brook-street, Holborn, in the city of London, engineer, for his invention of certain improvements in rotary steam-engines.—Sealed 6th March—6 months for inrolment.

To Auguste Victor Joseph Baron d'Asda, of Millman-street, Bedford-row, in the county of Middlesex, for improvements in producing or affording light, which he denominates a solar light, being a communication from a foreigner residing abroad.—Sealed 6th March—6 months for inrolment.

To Walter Hancock, of Stratford, in the county of Essex, engineer, for his invention of certain improvements in steam boilers and condensers.—Sealed 6th March—6 months for inrolment.

To George Robert d'Harcourt, of Howland-street, Fitzroy-square, in the county of Middlesex, gentleman, for his invention of certain improved artificial granite stone, marble, or concrete, in which said invention neither

asphalte nor bituminous substances are used.—Sealed 6th March—6 months for inrolment.

To William Vickers, of Tirshill, in the parish of Sheffield, in the county of York, merchant, for his invention of a mode of obtaining tractive power from carriage wheels under certain circumstances.—Sealed 6th March—6 months for inrolment.

To John Clark, at present residing in Upper Thames-street, in the city of London, engineer, for his invention of a new or improved form or construction of a leg and foot for propelling carriages on rail or common roads, and a new combination or arrangement of machinery for locomotive carriages, by means whereof the weight of the load to be carried is rendered applicable as part of the power for moving or propelling the carriage on which it is supported or rests.—Sealed 6th March—6 months for inrolment.

To Charles Schafhautl, of Cornhill, in the city of London, gentleman, for an improved method of smelting copper ore. Sealed 6th March—6 months for inrolment.

To Orlando Jones, of Rotherfield-street, Islington, in the county of Middlesex, accountant, for his invention of improvements in the manufacture of starch, and the converting of the refuse arising in or from such manufacture to divers useful purposes.—Sealed 6th March—6 months for inrolment.

To George Holworthy Palmer, of Surrey-square, Old Kent-road, in the county of Surrey, civil-engineer, and George Bertie Paterson, of Hoxton, in the county of Middlesex, engineer, for their invention of certain improvements in gas meters.—Sealed 6th March—6 months for inrolment.

To Thomas Horton, of Princes-end, in the parish of Tipton, in the county of Stafford, boiler-maker, and Thomas Smith, of Horsley-heath, in the same parish and

county, mine-agent, for their invention of certain improvements in the making or constructing chains for pits, shafts, mines, or other purposes.—Sealed 6th March—6 months for inrolment.

To Edward Ford, of Liverpool, in the county of Lancaster, builder, for his invention of certain improvements in conducting the manufacture of salt-cake or sulphate of soda, and hydrochloric or other acids and alkalies, or other chemical processes wherein deleterious vapours are given off, and in the erection of furnaces and works connected therewith.—Sealed 8th March—6 months for inrolment.

To Josias Christopher Gamble, of St. Helens, in the county of Lancaster, manufacturing chemist, for his invention of improvements in apparatus for the manufacture of sulphate of soda, muriatic acid, chlorine, and chlorides.—Sealed 14th March—4 months for inrolment.

To Elisha Hoydon Collier, late of Boston, in the United States of North America, but now of Globe-dock factory, Rotherhithe, in the county of Surrey, civil-engineer, for his invention of improved machinery for manufacturing nails.—Sealed 14th March—6 months for inrolment.

To Christopher Nickels, of York-road, Lambeth, in the county of Surrey, manufacturer, for his invention of improvements in the mode of manufacturing of fabrics from linen, woollen, silk, and other fibrous materials.—Sealed 15th March—6 months for inrolment.

To Richard Lamb, of David-street, Southwark, in the county of Surrey, gentleman, for his invention of improvements in apparatus for supplying atmospheric air in the production of light and heat.—Sealed 15th March—6 months for inrolment.

To Alexander Francis Campbell, of Great Plumstead, in the county of Norfolk, Esq., and Charles White, of the city of Norwich, mechanic, for their invention of certain

improvements in ploughs.—Sealed 18th March—6 months for inrolment.

To Thomas Henry Ryland, of Birmingham, in the county of Warwick, screw-manufacturer, for his invention of an improved manufacture of screws for wood, in iron, brass, copper, or any mixed metals, commonly known as wood screws.—Sealed 18th March—6 months for inrolment.

To John Ruthven and Morris West Ruthven, of Edinburgh, civil-engineers, for their invention of improvements in boilers for generating steam, economizing fuel, and propelling vessels by steam or other power, and ventilating vessels; and which may be applied to mines and buildings. —Sealed 20th March—6 months for inrolment.

To Edward Law, of Downham-road, Kingsland, in the county of Middlesex, gentleman, for his invention of certain improvements in evaporating sea-water and other fluids, and in the manufacture of salt.—Sealed 20th March —6 months for inrolment.

To Joseph Amesbury, of Burton-crescent, surgeon, for a certain apparatus for the support of the human body.—Sealed 20th March—6 months for inrolment.

To Andrew Smith, of Princes-street, Leicester-square, engineer, for certain improvements in the manufacture of ropes, for cables and other purposes to which ropes are applicable.—Sealed 20th March—6 months for inrolment.

To George Nelson, of Milverton, Warwick, chemist, for a new or improved method, or new or improved methods of preparing gelatine, which has the properties of, or resembles glue.—Sealed 23d March—6 months for inrolment.

To Thomas Fisher Salter, of Hallingsbury, in the county of Sussex, farmer, for an improved machine for winnowing and dressing corn and other grain.—Sealed 23d March—6 months for inrolment.

To Richard Roberts, of Manchester, civil-engineer, for an improvement, or certain improvements of, in, or applicable to the mule Billy Jenny stretching frame, or any other machine or machines, however designated or named, used in spinning cotton, wool, or other fibrous substances, and in which either the spindles recede from and approach the rollers or other deliverers of the same fibrous substances, or in which such rollers or deliverers recede from and approach the spindles; being an extension for seven years of former Letters Patent for the said invention.—Sealed 26th March.

To Henry Montagu Grover, of Boveney, Buckingham, clerk, for improvements in brewing, by the use of a material not hitherto so used.—Sealed 26th March—6 months for inrolment.

To Joseph Leese, junior, of Manchester, calico-printer, for certain improvements in the art of printing calicoes, muslins, and other woven fabrics, and in certain processes connected therewith.—Sealed 26th March—6 months for inrolment.

To Edmund Butler Rowley, of Manchester, surgeon, for an improved steam-engine, applicable to locomotive, marine, and stationary purposes.—Sealed 26th March—6 months for inrolment.

To Elisha Hale, of Leadenhall-street, for improvements in umbrellas and parasols.—Sealed 27th March—6 months for inrolment.

To William Newton, of the Office for Patents, Chancery-lane, in the county of Middlesex, civil-engineer, for certain improved machinery for cutting and removing earth, which machinery is applicable to the digging of canals, and the levelling of ground for railroads or ordinary roads, and similar earth-works.—Sealed 27th March—6 months for inrolment.

CELESTIAL PHENOMENA, FOR APRIL, 1839.

D.	H.	M.	
1			Clock before the sun, 4m. 5s.
—			☽ rises 9h. 41m. A.
—			☽ passes mer. 1h. 19m. M.
—			☽ sets 6h. 0m. M.
			Encke's Comet R. A. 21h. 50m. dec. 19. 37.
			Ditto passes mer. 21h. 11m.
3	5	41	♀ in the ascending node.
	18	56	♃ in oppo. to the ☉.
	20	20	♄ in conj. with the ☽ diff. of dec. 7. 7. N.
4	8	11	♃'s third satt. will em.
5			Clock before the sun, 2m. 53s.
—			☽ rises 1h. 17m. M.
—			☽ passes mer. 4h. 30m. M.
—			☽ sets 7h. 41m.
			Encke's Comet R. A. 21h. 56m. dec. 19. 11.
			Ditto passes mer. 21h. 0m.
	8	10	♃'s first satt. will em.
6	7	8	Ceres in oppo. to the ☉, intens. of light 1.331.
7	1	54	☿ greatest hel. lat. N.
	4	33	☽ in □ or last quarter.
	8	31	☿ greatest elong. 19. 14. E.
10			Clock before the sun, 1m. 27s.
—			☽ rises 4h. 10m. M.
—			☽ passes mer. 8h. 59m. M.
—			☽ sets 2h. 3m. A.
			Encke's Comet R. A. 22h. 2m. dec. 18. 41.
			Ditto passes mer. 20h. 46m.
	7	58	♃'s second satt. will em.
	15	36	♃'s third satt. will em.
11	12	9	♃'s third satt. will em.
12	10	4	♃'s first satt. will em.
	21	13	♅ in conj. with the ☽ diff. of dec. 0. 13. N.
13	10		☽ in Perigee.
	11	18	Ecliptic conj. or ● new moon.
14	15	29	☿ in conj. with the ☽ diff. of dec. 0. 48. S.
15			Clock before the sun, 0h. 8m.
—			☽ rises 5h. 24m. M.
—			☽ passes mer. 1h. 23m. A.
—			☽ sets 9h. 45m. A.
			Encke's Comet R. A. 22h. 7m. dec. 18. 13.
			Ditto passes mer. 20h. 32m.
—			Mercury R. A. 2h. 30m. dec. 18. 1. N.
—			Venus R. A. 3h. 22m. dec. 19. 6. N.
—			Mars R. A. 10h. 55m. dec. 9. 47. N.
—			Vesta R. A. 6h. 43m. dec. 25. 26. N.
—			Juno R. A. 22h. 41m. dec. 3. 10. S.

D.	H.	M.	
15			Pallas R. A. 13h. 2m. dec. 18. 27. S.
—			Ceres R. A. 13h. 16m. dec. 8. 17. N.
—			Jupiter R. A. 12h. 48m. dec. 3. 25. S.
—			Saturn R. A. 16h. 33m. dec. 20. 0. S.
—			Georg. R. A. 23h. 5m. dec. 6. 41. S.
—			Mercury passes mer. 0h. 58m.
—			Venus passes mer. 1h. 50m.
—			Mars passes mer. 9h. 21m.
—			Jupiter passes mer. 11h. 14m.
—			Saturn passes mer. 14h. 59m.
	12	52	♀ in conj. with the ☽ diff. of dec. 4. 4. S.
17	2	4	☿ stationary.
	10	34	♃'s second satt. will em.
19	11	58	♃'s first satt. will em.
20			Clock after the sun, 1m. 3s.
—			☽ rises 9h. 40m. M.
—			☽ passes mer. 6h. 23m. A.
—			☽ sets 2h. 18m. M.
			Encke's Comet R. A. 22h. 12m. dec. 17. 48.
			Ditto passes mer. 20h. 17m.
	4	54	☽ in □ or first quarter.
23	13	21	♂ in conj. with the ☽ diff. of dec. 1. 14. N.
	14	5	♂ stationary.
25			Clock after the sun, 2m. 4s.
—			☽ rises 3h. 56m. A.
—			☽ passes mer. 9h. 59m. A.
—			☽ sets 3h. 39m. M.
			Encke's Comet R. A. 22h. 16m. dec. 17. 26.
			Ditto passes mer. 18h. 19m.
26	3	59	♃ in conj. with the ☽ diff. of dec. 3. 27. N.
	13	52	♃'s first satt. will em.
27	3		☽ in Apogee.
	8	44	☿ in inf. conj. with the sun.
28	7	25	Ecliptic oppo. or ○ full moon.
	8	31	♃'s first satt. will em.
29			Gambart's Comet R. A. 1h. 38m. dec. 16. 31.
			Ditto passes mer. 23h. 9m.
30			Encke's Comet R. A. 22h. 20m. dec. 17. 6.
			Ditto passes mer. 19h. 46m.
	13	43	☿ in the descending node.
	17	36	Juno in conj. with ♅ diff. of dec. 5. 26. N.
	23	56	♄ in conj. with the ☽ diff. of dec. 7. 2. N.

J. LEWTHWAITE, Rotherhithe.

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No. LXXXVI.

Recent Patents.

To Francis Sleddon, *of Preston, in the county of Lancaster, machine-maker, for his invention of certain improvements in the machinery or apparatus for spinning and doubling cotton, silk, flax, wool, and other fibrous substances.*—[Sealed 2d June, 1838.]

These improvements in machinery or apparatus for spinning and doubling cotton, silk, flax, and other fibrous substances, consist, firstly, in the mechanism or apparatus usually employed in spinning, and known or called by the name of "hand mules;" and is more particularly applicable to the "steam-head" or driving headstock of such machines, in order to perform the necessary evolutions of the drawing rollers, the running out of the carriage, and the spinning and winding on of the thread or yarn with considerable economy of the mechanism employed, and also in order to effect many important advantages in the yarn or

thread produced. Secondly, the improvements apply more particularly to the driving of the vertical spindle drums in the hand mules, self-acting mules, or any spinning machinery wherein such vertical drums may, or shall, be used for driving the spindles on which the yarn is wound or spun; which said improvement is to be effected by the application of toothed wheels, having their teeth bevilled and set askew, or not bearing radially towards their centre, and commonly called "askew gear." It will be seen, that by means of the application of askew gear to this purpose, I am enabled to have an horizontal driving shaft extending through the whole length of the machine, and driving each drum by gear, with the advantage of crossing their driving centres, and getting a good bearing for the shaft of the spindle drum. I propose a further improvement also in the drums for drawing the spindles; that is, to make them with open ends, their periphery being mounted upon arms, instead of having their ends closed to form the bearings of the central shaft. This improvement upon the construction of spindle drums will dispense in a great measure with the noise usually caused by such parts of spinning machinery. And, thirdly, the improvements in spinning apply particularly to the running or spindle carriage usually employed in mules in general. These carriages I make much lighter, and, at the same time, increase their strength and accuracy, by connecting together the end frames and other supporters by means of light wrought iron rods extending the length of the carriage, and passing through the whole of the supporters and carriage-frame ends (of whatever length the carriage may be required), in one piece, without the necessity of any further framing or connexion.

In order that these several improvements in spinning machinery may be more definitely explained and par-

ticularly understood, Plate IV. contains representations of a hand mule constructed upon the principle of my improvements, having similar letters of reference marked upon corresponding parts of the mechanism in all the respective figures.

Fig. 1, is a front elevation of the mule; fig. 2, a plan or horizontal view of the same; and fig. 3, is a vertical section taken transversely through the machine: A, A, are the main standards or framings of the stationary or roller end of the mule; these frames or standards support the creel B, B, which carries the rovings, and also support the roller beam C, C, which carry the drawing rollers D, D, in the ordinary manner; E, E, E*, E*, is the spindle carriage, which is constructed entirely of iron, and is formed by the frame ends or supporters E, E, being bolted and secured together by means of the round wrought iron rods or bars E*, E*; these bars pass through the whole length of the carriage frames, and thus connecting them, forms a spindle carriage of great truth, and much lighter than those in common use: this carriage E, E*, carries the spindles F, F, upon which the yarn is to be wound or spun, and is supported upon the wheels G, G, which have smooth plain peripheries running upon the planed railways H, H, as the carriages perform their going in and out.

It will be seen, in these figures, that the spindle carriage is shown run out, the sketch of the yarn completed, the whole machinery being at rest, and the spindles ready to wind on the yarn upon the putting up or going in of the carriage by the driving strap I, being upon the idle or loose pulley K, and those parts which are worked by power thus entirely out of action. Now, in order to wind the yarn on to the spindles during the going in of the carriage E, E, the spinner or operator turns any of the handles *a*, *a*, which are set in the circular plate b, (see fig. 3,) thus

causing the diagonal shaft *c*, *c*, to revolve, and by means of the bevilled pinion *d*, at its lower end gearing in the bevil wheel *e*, keyed fast upon the drum or driving shaft f, f. This drum shaft f, is mounted in the carriage ends E, and extends throughout the whole length of the carriages, and the askew bevilled wheels *g*, upon the shaft f, gearing into the askew pinions *h*, *h*, upon the lower ends of each vertical drum shaft *i*, *i*: this causes the drums *j*, *j*, to revolve, and by the usual method of banding, to drive the spindles F, F, and consequently to wind on the yarn. The running in or putting up of the carriage is also effected by the spinner pressing against the faller shaft *k*, *k*, which, together with the working of the fallers, is performed in the usual manner of hand mule spinning. Now, as soon as the carriage has been put up, and the winding on of the yarn has been completed, a stop or catch upon the horizontal setting on rod *m*, *m*, (see fig. 2,) striking against the carriage, vibrates the bell crank lever *n*, *n*, and slides the strap guide *o*, *o*, sideways, thus passing the driving strap I, from the loose pulley K, on to the pulleys *p*, *q*, in order to drive the drawing rollers and deliver the yarn, and, at the same time, to drive the spindles whilst the going out of the carriage or the stretch of the yarn is being performed: during these operations, the strap is kept from shifting upon the pulleys *p*, and *q*, by means of the weight *r*, and rods *s*.

It will be seen that these pulleys are all mounted upon the shaft *t*, *t*, which is supported in its bearings in the steam head or driving headstock L, L, the idle pulley K, being loose upon the shaft *t*; and the pulley *p*, being fast upon the shaft *t*, while the pulley *q*, is loose upon the shaft *t*, but fast upon the boss *u*, of the bevil wheel *v*, and is thus supported upon the shaft *t*. The driving strap I, having now been passed around the pulleys *p*, and *q*, the pulley *p*, will, by means of the band pulleys *w*, *w*, at each end of the

shaft *t*, and the bands *x*, *x*, passing around them, and the pulleys *y*, *y*, mounted upon a shaft in the standards A, A, and also around the pulleys *z*, *z*, mounted upon the drum or driving shaft *f*, *f*, thus cause that shaft to revolve, and by means of the askew bevilled gearing, drive the spindles as before explained.

The going out of the spindle carriage E, E, has also been performed simultaneously by means of the driving strap I, being also passed around the pulley *q*; for as this pulley runs loosely upon the shaft *t*, and is keyed fast upon the boss *u*, of the bevil wheel *v*; and this wheel *v*, is in gear with the pinion 1, at the lower end of the vertical shaft 2, having another bevil pinion 3, at its upper end in gear with the bevil wheel 4, upon one end of the horizontal shaft 5, this shaft is made to revolve, and by means of the gearing 6, 6, at its other end, causes the drawing rollers to deliver the rovings to the spindles, and, at the same time, by actuating the mitre wheels 7, 7, gives a rotary motion to the bevil wheels 8, 8. It will be seen that the larger of these wheels 8, is fixed upon the upper end of the vertical shaft 9, 9, and that upon the lower end of this shaft there is a spur pinion 10, in gear with the rack 11; this rack is attached to the spindle carriage E, E, and travels upon rollers 12, 12, running upon plates 13, 13, screwed to the floor.

At the same time that the driving strap is passed round the pulleys *p*, and *q*, a small spring and catch piece upon the frame (which cannot readily be shown in the figures) strikes against the foot of the vertical shaft 9, and causes it to swing the pinion 10, into gear with the carriage rack 11, and thus drive the carriage out to perform the stretch of the yarn. When the carriage is putting up, the catch and spring 14, at the other end of the rack carriage, strikes against the pinion 10, and as the carriage runs

in, throws that pinion out of gear with the rack, at the same time that the driving strap is passed round the idle pulley I, in order that the spinning and winding on may again be performed by hand.

In winding the yarn on to the spindles, the operator or spinner is prevented from "backlashing" the threads, by a peculiar arrangement of mechanism forming the copping motion of the mule; this motion is shown at the left-hand end of the machine in figs. 1, and 2. There is a small adjustable stop or screw 15, set in the frame A, and a vibrating pallet 16, and pallet wheel 17, mounted upon the spindle carriage, so that at each put up of the carriage, this pallet 16, being struck against the stop 15, the pallet wheel is made to escape one tooth. This pallet wheel is keyed fast upon the vertical rod 18, (see fig. 1,) which has a screw thread cut upon its upper end, working in the stationary nut or socket 19, fixed to the spindle carriage.

Now, as the spinner turns the faller shaft *k*, *k*, in order to lower the bows 20, 20, and the faller wire 21, 21, the tail piece 22, at the end of the faller shaft, working in the mortice at the top of the socket 19, strikes against the end of the vertical rod 18, which is raised by the pallet wheel and screw the thickness of a thread every time the carriage runs in, thus causing the action of the faller to be diminished, and, consequently, shapes the cop until the whole of the lift is performed and the cop completed.

There is a band pulley 23, 23, at each end of the spindle carriage, round which a band 24, is passed, being fast at each end to the studs 25, 25, for the purpose of causing the carriages to run trim and smooth, and preventing any little vibration which might occur in very long carriages.

Having now described my improvements in spinning machinery, I wish it to be particularly understood that I claim as my invention, firstly, the peculiar arrangement and

construction of the mechanism constituting the mule for hand spinning, as represented in the drawings attached, as far as the same is novel in its application and effect, in the manner and for the purposes above particularly described; secondly, the peculiar application of the askew bevilled gear, for the purpose of driving the spindle drums in all spinning machinery; and lastly, the particular construction of the spindle carriage with its copping motion, as also above described.—[*Inrolled in the Rolls Chapel Office, December*, 1838.]

Specification drawn by Messrs Newton and Berry.

To HERMAN KESSELS, *Major in the Belgian Artillery, and knight of several military orders, now residing in St. Mary Axe, in the city of London, for his invention of certain new and improved means or apparatus for the saving of lives and property from fire, which he denominates the Salvator.*—[Sealed 7th June, 1838.]

THIS invention is the adaptation of a long ladder as a fire escape, which, about one-third up from its lower end, is mounted upon a horizontal axle, and is thereby enabled to rise and fall as a lever of the first order. The axle, which is the fulcrum of the ladder, is mounted upon upright standards fixed in a platform that turns horizontally upon a carriage moveable on wheels.

In the event of a house being on fire at the lower part, and its inmates desiring to escape from a window in one of the upper stories, the wheeled carriage is brought to the spot, and the lever ladder raised to the required altitude by means of two ropes, one of which is attached to the bottom of the ladder, and the other to the top; and their other ends are connected to a barrel below. This barrel is

turned by a winch or handle, and by winding on the upper rope, and, consequently, unwinding the lower one, the ladder is raised to the desired altitude, the horizontal position being adjusted by turning it with its platform upon the carriage.

There are legs or props which fall outward from the top of the ladder to support it, instead of its bearing against the wall of the building; and a basket is suspended at top, into which any person may step from the window, and so get on to the ladder, or it may receive any valuable articles of furniture; and when the carriage has been withdrawn from the building, the top end of the ladder may be lowered by turning the winch and barrel in the opposite direction, so as to bring the basket to the ground.—[*Inrolled in the Inrolment Office, December,* 1838.]

To EDWARD DAVY, *of Fordton, near Crediton, in the county of Devon, merchant, for his invention of certain improvements in saddles and harness for horses, and in seats for carriages.*—[Sealed 13th January, 1838.]

THE objects of these improvements in saddles and harness are, first, the prevention of rubbing or friction between the skin or coat of the animal, and certain parts of the saddle or harness which come in contact therewith, such as the pannels of riding saddles, harness pads, &c. Secondly, to render these and other parts of saddles or harness which come into contact with the body of the animal, such as "collars," "cruppers," "saddle-cloths," "false collars," "belly-bands," and "girths," elastic, soft, or yielding to pressure, for the purpose of producing an easy fitting on the body of the animal, and greater ease or comfort while working; also to prevent such parts from becoming stiff

or hardened by the perspiration of the animal, which parts will be more easily cleansed and be more durable than those constructed in the ordinary way. Thirdly, to give greater elasticity to the seat of the saddle, and, consequently, ease and comfort to the rider; and, lastly, to produce better friction or adhesion of contact between the sole of the boot or shoe of the rider, and the foot-rest of the stirrup, in order to prevent the foot slipping thereon in riding.

These advantages I attain, firstly, by the novel adaptation and application of sheet or sliced India rubber or caoutchouc, as linings or coverings for the above-named parts of saddles or harness, which come in contact with the body of the animal or seat of the rider; and, secondly, in the use and application of elastic woven fabric or India rubber web (made or constructed according to the patent of Mr. R. W. Seivier, or otherwise), in the making or construction of riding saddles, instead of the rigid or non-elastic cloth or linen web, ordinarily used and stretched over the saddle-tree, to receive the padding or stuffing in the seat of the saddle; and, lastly, in the application of India rubber to the stirrup iron, for the purpose of producing friction or adhesion between the same and the boot or shoe of the rider; that is to say, I use sheet India rubber or caoutchouc (either in its native state, or after being prepared in the usual manner, and cut into sheets or slices of the required thickness,) as *linings or coverings* to all the before-named parts of saddles and harness, which come into contact with the body of the animal, for the purpose of producing *either adhesion* or *close contact* to its skin or coat, and thereby preventing the slipping or movement of such parts, or an *elastic, soft, or yielding quality* in these parts; and I use and apply the said elastic woven fabric or web in the construction of riding saddles, to increase the elastic

or yielding quality of the saddle, as above stated. And, lastly, I apply or adapt the said material (caoutchouc) to the stirrup irons, for the purpose of producing friction or adhesion of contact with the soles of the boots or shoes of the rider, and preventing the feet slipping in the stirrups when riding.

Having thus stated the objects and nature of my said invention, I will proceed to describe more particularly the manner in which I propose to carry my said improvements into effect. First, in reference to riding saddles.

Plate V., fig. 1, is a top view of a complete saddle, with my improvements applied thereto; fig. 2, is a representation of the same as seen on the under side. I first procure a saddle-tree, made in the ordinary manner, but having the cantle or hinder part a little higher than usual, in order that the elastic India rubber web or fabric, when used as already mentioned (instead of the ordinary linen web), may be placed sufficiently high or above the back of the animal at that part to allow of the elasticity of the said India rubber web being brought into action, without coming in contact with, or pressing thereon, as it yields to the weight of the rider. I strain and nail two or three breadths of the said elastic India rubber web on to the tree, after the manner the common linen web is applied, only remarking that the India rubber web must not be cut or split lengthwise. I then proceed in the usual way to pad the sides of the saddle with the ordinary kind of stuffing, so as to give the proper shape to the seat; and I then strain serge or woollen cloth over the seat as usual, and stuff it with wool, hair, or other suitable material, combined with some fine shavings or cuttings of India rubber. I then strain over the covering of serge or woollen cloth a piece of undressed linen or cotton cloth, fastening it at the edges in the way in which serge is usually

secured; I then cover the said linen or cotton cloth with two coatings of thick solution of India rubber, as commonly prepared, by dissolving it in spirits of turpentine or other solvent; which solution may be laid on either with the hand or with a brush, the first coating being allowed to set or dry before the second is applied. A piece of stout leather is then to be nailed to the back of the cantle at *a*, *a*, (see fig. 2,) against the edges of which the upper covering of sheet India rubber *b*, *b*, is attached, as shown in the drawing. The sheet India rubber forming such covering is to be of about one eighth of an inch in thickness, or more, if required, and is cut with a knife (dipped in water) to the proper shape for the seat of the saddle, as shown in fig. 1. The said covering should be a little larger than what is seen in the drawing, for the purpose of allowing the edges thereof to be covered with the leather skirts *c*, *c*, and the edging *h*, at the pommel. If one sheet of India rubber cannot be procured sufficiently large for the purpose, two or more pieces may be easily joined together by cutting their edges even, and applying to them a little of the before-named solution, and bringing them into close contact with each other; when the solution is dry or set they will be firmly united.

When the sheet of India rubber is prepared to the required shape, I apply on the underside thereof a thin coating of the solution, and place the sheet smoothly on to the seat of the saddle before the last coating of solution on the linen or cotton cloth is quite dry or set, and by pressing over the sheet India rubber with the hand, it becomes firmly attached to the linen cloth. The seat of the saddle may remain in this state, with the naked India rubber outwards, as shown in fig. 1, which would prevent the rider slipping on his saddle, and, consequently, give firmness to his seat; or it may be covered with thin leather; or ladies' saddles may be covered with kid, buckskin, or other

leather, plain or ornamented, or any other plain or ornamental covering, as silk, velvet, cloth, &c.: all, or any of which materials may be firmly united to the sheet India rubber by means of the solution before described, and thus produce a novel and elegant appearance.

The edges of the covering of sheet India rubber *b, b*, are to be bevilled off to allow the leather skirts *c, c*, and flaps *d, d*, to be joined to and lie smoothly over the said edges; I then nail on to the saddle tree the under flaps *e, e*, and place against the under part of the tree a pannel or stuffing, covered with linen or cotton cloth, which may extend as far as the under flaps *e, e*, as may be thought desirable; I then place a sheet of India rubber, about one eighth of an inch thick (or thicker if desired), over the said pannels or flaps, as seen at *f, f*, fig. 2, and attach the same thereto by the solution of India rubber before named; the surface of the lining or covering of sheet India rubber is to be left plain or naked, in order to produce one of the advantages named in the former part of this specification, viz., adhesion or close contact with the skin or coat of the animal, to prevent the saddle slipping or moving out of its proper place.

The skirts *c, c*, are to be prepared for fastening on by paring down, smoothing, or bevilling off neatly their under edges, which are placed nearest the seat of the saddle; and having laid on the edges so prepared one or more coatings of solution, I attach them carefully to the India rubber *b, b*, securing the skirts with the nails *g, g*, as usual. An edging of leather *h*, is placed in front of the pommel, and thin leather may be used to cover the joints at the back of the saddle, between the parts *a*, and *b*. Whenever leather is attached by solution, the parts of contact should be well scraped, in order to ensure more perfect adhesion.

Or saddles may be made without any tree, by placing a

piece of linen cloth between two sheets of India rubber of sufficient thickness to form the seat, uniting the same thereto by means of solution; which saddles are to be raised by padding at the pommel and cantle. The cloth must be sufficiently large to extend over the leather flaps, for the purpose of holding the several parts firmly together. The flaps may be attached to the cloth by means of the solution, and the under ones covered with India rubber, as before described. The stirrups and girth straps may be made to pass over the back of the animal, and to rest on, and be attached to, the India rubber forming the seat. These stirrup leathers and girth straps are to be covered with a thin sheet of India rubber, for the sake of appearance.

And, lastly, as regards riding saddles, I would remark that any suitable knee padding may be placed at *i*, *i*, in fig. 1, and coated with sheet India rubber, which may be left naked or covered with other materials as desired.

Next, as to harness. The saddle or pad may also be constructed either with or without a tree, in a similar mode to that described for *riding saddles*, the under side being covered with sheet India rubber; but in these saddles or pads there is no occasion for placing India rubber on the upper part.

The crupper is another part of harness to which my improvements apply, that is the part which is placed immediately under the tail of the animal. It is made or constructed by rolling sheet India rubber around an elastic or other strong cord; fig. 3, is a representation of a crupper, with its buckles attached thereto; fig. 4, is a section taken through the elastic or yielding part *a*, *a*, which is placed under the tail of the animal; *b*, *b*, are the buckles and straps for connecting it to the harness. The joints and edges of the sheet India rubber are secured by

the application of the solution before mentioned in reference to saddles, and the buckle straps are fastened both by solution and strong stitching through the Indian rubber and internal cord.

My improved collars are formed or constructed in the ordinary manner, stuffed with straw or reed, and are similar in external appearance to ordinary collars, except that over the portion of the straw or reed stuffing which comes next the neck and shoulder of the animals, I prefer placing a piece of strong linen cloth, and stitching it down firmly to prevent the straw or reed from getting loose; and over this linen cloth to fasten a piece of leather with the rough side outwards, large enough to admit a sufficient quantity of padding or stuffing of wool hair, or other suitable materials combined with shavings or cuttings of India rubber, to render the collar softer and more pliable in these parts; I then lay on this outer leather a coating of India rubber solution, and cover it with sheet India rubber of about one quarter of an inch thick, which forms the lining, as shown in the drawing. Fig. 5, is a front view of a collar, with my improvements applied thereto; fig. 6, is an inside representation of the same; *a, a,* is the front or ordinary outer leather covering of the collar; *b, b,* the inside or sheet India rubber lining, which may be left naked or covered with bronze powder, or any suitable varnish, if thought desirable.

In adapting my improvements to saddle girths or belly bands, I take such as are commonly used, and having applied to them the said India rubber solution, I cover the same with sheet India rubber, as before described, carefully securing all the joints or edges thereof.

Having now described my improvements, as applied to riding saddles, harness saddles, or pads and collars, I would remark that some of the same effects and advantages may

be produced by the use and application of India rubber in the manufacture of saddle cloths and false collars, to be placed between any saddle or collar, and the skin of the animal. These I make or manufacture of stout linen or cotton cloth, or thin leather, as the foundation and coat, or cover the same on one or both sides with sheet India rubber, secured thereto by the solution of India rubber before named and described. Fig. 7, is a front representation of one of my important false collars; fig. 8, is a partial edge view, and fig. 9, a transverse section of the false collar: *a, a,* is the internal cloth or foundation; *b, b,* the outer coverings of India rubber; *c, c,* is a binding of cane or other fit substance placed around the inner edge of the false collar, for the purpose of keeping it in its proper shape, and in place when used under the collar. The covering or lining of India rubber may be bronzed or varnished in the manner before stated, either on one or both of the sides, if thought desirable.

And, lastly, my improvements as applied to stirrups, for the purpose of producing friction of contact, and preventing the foot from slipping, as above named, consist in fixing India rubber within the stirrup iron, upon which the feet are to be placed in riding: these pieces of India rubber may be fastened on to the stirrup iron in any convenient manner; for instance, by sewing, rivetting, countersinking, or otherwise fastening the same on to the stirrup iron. Fig. 10, is a side representation of a stirrup iron, with the piece or block of India rubber applied thereto; fig. 11, is a section of the same; *a,* is the ordinary stirrup iron, the plate or foot-rest *b,* in this instance, being formed of a dished figure, with a projecting rim or edge *c, c,* around the outside, or the plate, or foot-rest, for the purpose of retaining the piece of block India rubber *d,* in its proper place, but which may be secured by one, two,

or more rivets passed through holes formed in the India rubber, and the foot-rest, or by any other suitable mode.

And in conclusion, I would remark that when joining any surfaces of leather together, by sewing the above-named, or any other parts of saddles or harness, I prefer applying or using the solution of India rubber above mentioned to such surfaces, and pressing them together previous to sewing, which will make the junction more perfect, and prevent the admission of wet between the parts of leathers so joined, and, consequently, better preserve the stitches from decay.

Having now described and ascertained the nature of my said invention, and a mode of carrying the same into effect, I wish it to be understood that I do not mean or intend to claim, or confine myself to any particular mode of manufacturing or putting together the several parts of saddles or harness, nor the method of employing or combining the several materials described in this specification; but that which I do claim as my invention, is the adaptation and application of India rubber in sheets or slices to the various parts of saddles or harness above named, for the purpose of attaining the objects and effects above described and set forth, and also the adaptation and application of elastic India rubber web to saddles, as described.—[*Inrolled in the Rolls Chapel Office, July,* 1838.]

Specification drawn by Messrs. Newton and Berry.

[Since the sealing of the above patent, a disclaimer of that part of the title which relates to seats for carriages has been entered, so that the title now stands thus: "certain improvements in saddles and harness for horses."—Ed. Lond. Jour.]

To Hugh Ford Bacon, *of Christ's College, Cambridge, in the county of Cambridge, gentleman, for his invention of an improved apparatus for regulating the flow of gas through pipes to gas burners, with a view to uniformity of supply.*—[Sealed 9th April, 1835.]

In this improved apparatus for regulating the flow of gas through pipes to gas burners, I effect the greater uniformity of its supply by a novel mode or modes of employing the varying pressure of the gas in its passage through the apparatus from the gasometer to the burner, so as to open or close the aperture or apertures through which it is made to pass, more or less, and in proportion to the said varying pressure.

One method of effecting this object is shown in Plate V., at fig. 1, in the drawing annexed, in which figure *a, a*, represents a front section of a vessel made either of glass, metal, or other fit and proper materials, and closed or shut up, except at the passages *b*, and *c*; *b*, for the entrance, and *c*, for the escape of the gas. To the tube or pipe *b*, a balanced arm or lever *d*, is affixed, which moves or turns upon a pin or axis *e*, screwed into the side of the tube *c*. A slit *f*, communicates with the box *g*, (shown by dotted lines) in this tube, the lower end of which is closed, through a flattened outside part or surface of the tube, and a flat piece of metal or governor *h*, which is formed in one, with the arm or lever *d*, is fitted immediately in front of the slit *f*, and by means of its edge, shuts off or opens the said slit more or less, according as the arm of the lever *d*, is depressed or raised, as shown by the dotted lines: *i*, is the counterbalance of the lever *d*; *j, j*, is a membrane or piece of oiled or varnished silk, or other flexible and air-tight material; this is tightly bound or secured as evenly as possible round the outer side of the larger part of the ring

k, k, (but without being strained tight over it,) which ring *k, k,* is fitted within the vessel *a, a,* so as to prevent all escape of gas below it and the membrane *j, j*; *l, l,* is a convex metal disc, which is hung or jointed to one end of the lever *d,* by means of the metal rod or wire *m,* which is screwed and passed through the disc *l, l,* and membrane *j, j,* and secured by a screwed binding nut *n,* so as to be gas-tight. A helical metal spring *o,* is placed underneath the disc *l,* and acts against it, so as to raise it up, whilst the other end of the spring is supported upon a metal plate *p,* which has three holes in its outer part, whereby it is held upon three metal screwed wires, two of which are shown at *q, q,* as affixed into the ring *k, k,* as before stated, by reason whereof it is capable of a certain degree of elevation or depression. When the disc *l, l,* is raised by the action of the helical spring *o,* the membrane *j, j,* is elevated with much evenness and smoothness on the convex surface of the disc *l, l,* pressed against it into the position shown at fig. 1.

The gas entering by the passage *b,* presses upon, and has a tendency to depress the membrane *j, j,* more or less, according to the greater or less degree of pressure of the gas. The membrane *j, j,* communicates the pressure so received by means of the disc *l, l,* equally to the spring *o,* which is thereby depressed or shortened, more or less, in proportion to the pressure of the gas, and its own strength or power of resistance. The rod *m,* by the same movement, lifts the end of the lever *d,* and the plate or governor *h,* is advanced over the upper part of the slit *f,* so as partially to shut off or close the same, and thereby restricts in a fitting degree the issue of the gas to the burners.

When the pressure of the gas in the vessel *a, a,* becomes from any cause diminished, the spring *o,* lengthens or rises up again, and by means of the rod *m,* elevates the end of

the lever *d*; and the plate or governor *h*, is drawn back from the face of the slit *f*, whereby a larger aperture is exposed, and a freer passage allowed to the issue of the gas to the burner or burners, as the case may require.

Fig. 5, is a front section of another apparatus for regulating the flow of gas through pipes to gas burners. In this apparatus, besides the vessel *a, a,* there is an inner vessel or cylindrical ring *v, v,* mounted gas-tight to the top or cover of the vessel *a,* and to the bottom of which said inner vessel or ring the metal ring *k, k,* is firmly affixed; and round the outer side of this ring *k, k,* the membrane *j, j,* is secured or bound tightly, but without being stretched or strained over the ring for the reasons above given. A hollow metal or glass bulb or float *w,* is screwed, or otherwise affixed to the lower end of the wire *m.* The slit *x,* connected with the box *g,* of that passage is here made segmental or curved, instead of straight, as before described. Water or other proper liquid is to be poured into the outer vessel *a, a,* through holes made in that part of its top or cover which lies between its side and the outside of the inner vessel *v, v,* (which holes also serve to allow a passage for the entrance and escape of the common or atmospheric air,) until the float or bulb *w,* becoming partly immersed, is buoyed up or caused to ascend to the position shown in fig. 5. The upper part of this float, marked *l, l,* is made convex, similar to the disc *l, l,* in fig. 1, and to answer a similar purpose; and when the lower part (by preference made conical, in order to obtain a more facile adjustment) is depressed by the action of the gas as it passes through the apparatus, as shown in fig. 6, it will cause the said liquid to rise in the outer vessel *a, a,* with a continually increasing resistance, varying according to the increased pressure of the gas, as is effected by the helical spring *o,* in fig. 1, and by the weight *u,* in fig. 4.

The movements of the float are communicated by means of the rod *m*, to the plate or governor *y*, moving over the slit *x*, and thereby the more equal flow of the gas to the burner is obtained, in a manner similar to that before described. The plates or governors *h*, and *y*, opening or closing the slits *f*, and *x*, more or less, according to the varying pressure of the gas in passing through the vessels *a*, *a*, fig. 1, and *v*, *v*, fig. 5.

Fig. 7, is constructed with two vessels *a*, *a*, and *v*, *v*, like the apparatus shown in fig. 5, but without the membrane *j*, *j*, and the disc *l*, *l*, or the ring *k*, *k*. The rod *m*, of the float or bulb *w*, is jointed to a lever *d*, with a governor *h*, similar to that shown in fig. 1: *n*, in fig. 7, is a screwed nut, affixed to the float *w*, by means of which it may be adjusted upon the screwed rod *m*, as required in use. In the float *w*, there are three pins fixed, two of which are shown at *a*, *a*, fig. 7, to prevent the sides of the float from coming in contact with the inner vessel *v*, *v*, which is brought down much nearer to the bottom of the outer vessel *a*, *a*, than in fig. 5; but room is left between them sufficient for the free passage of the liquid from one vessel to the other, the liquid always remaining at a sufficient height in the inner vessel *v*, *v*, to float the bulb *w*.

In this apparatus the gas, in its passage through it, acts by its pressure directly upon the surface of the liquid in the inner vessel *v*, *v*, instead of upon the membrane, as in figs. 5, and 6; and the float or bulb *w*, rises and falls with the rise and fall of the liquid itself, under the varying pressure of the gas, instead of acting upon the liquid by being forced or driven into it by the pressure of the gas on the membrane *j*, *j*, in the manner before described in figs. 5, and 6. The rising and falling of the liquid in the vessel *a*, *a*, in the space between it and the inner vessel *v*, *v*, at the same time that it falls or rises in the inner vessel *v*, *v*,

performs the office of the helical spring *o*, in fig. 1, and of the lever and weight *u*, in fig. 4, in producing a continually increasing or decreasing resistance, according to the varying pressure of the gas. The end of the lever *d*, being, by means of the rod *m*, raised or lowered, as the bulb or float *w*, rises or falls with the rise or fall of the liquid in the vessel *v*, *v*. The plate or governor *h*, has a corresponding movement over the slit *f*, opening or shutting it off more or less, according to the varying pressure of the gas in passing through the vessel *v*, *v*, to the burner, in a manner similar to that before described.—[*Inrolled in the Inrolment Office, October*, 1835.]

To Hugh Ford Bacon, *of Fen Drayton, in the county of Cambridge, clerk, for his invention of an improved apparatus for regulating the flow or supply of gas through pipes or gas burners, with a view to uniformity of supply.* —[Sealed 11th January, 1838.]

This improved apparatus for regulating the flow or supply of gas through pipes to gas burners, I effect the greater uniformity of its supply by a novel mode or modes of employing the pressure of the gas in the apparatus as it passes through from the gasometer to the burners, so as to cause the aperture through which it is admitted in the main or service pipe into the apparatus, to be increased or diminished, according to the greater or less pressure there may be in the pipe of supply, or to the greater or less quantity of gas actually required for consumption, so that the gas shall always issue from the openings or burners at which it is consumed with an uniform velocity, or nearly so; and my method of effecting this object is shown in Plate V., at fig. 8, in which *a*, *a*, represents a front section of a vessel

made of metal, glass, or other fit and proper materials, enclosed air-tight on all sides and parts thereof, except at the passages *b*, and *c*; *b*, for the entrance, and *c*, for the escape and delivery of the gas. The entrance tube or pipe *b*, is closed at the lower end thereof, and the gas is admitted into the vessel through a slit or longitudinal aperture *f*, communicating with the bore *g*, (shown by dotted lines,) the peculiar construction of which slit or aperture *f*, is after described. Above the slit, on the side of the tube *b*, a balanced arm or lever *d*, moves upon a pin or axis *e*, screwed into a shoulder or raised part of the said tube; and a flat piece of metal or slider *h*, formed in one with the arm or lever *d*, is so fitted immediately in front of the slit *f*, that when a motion is given to the arm or lever *d*, it passes gradually over the slit or aperture, and shuts off or opens it more or less, according as the arm of the lever is depressed or raised (as shown by the dotted lines); *i*, is the counterbalance of the lever *d*; *j*, *j*, is a membrane, or piece of oiled or varnished silk, or other flexible and air-tight material: this is tightly bound or secured as evenly as possible by its outer edge or skirt, round the outer side of the large part of the ring *k*, *k*, but without being strained tight over it; and the ring *k*, *k*, with the membrane so fastened and appended to it, is fitted and made good within the vessel *a*, *a*, so as to be air-tight; *l*, *l*, is a convex metal disc, which is hung or jointed to one end of the lever *d*, by means of the metal rod or wire *m*, which is screwed and passed through the disc *l*, *l*, and membrane *j*, *j*, and secured by screwed binding nuts above and below, preventing all escape of gas. A helical metal spring *o*, is placed underneath the disc *l*, and acts against it, so as to raise it up. The other end of the spring is supported upon a metal plate or stage *p*, which has three holes in its outer parts or corners, whereby it is held upon three metal screwed wires

(two of which are shown at *q*, *q*, as affixed into the ring *k*, *k*,) by means of screwed nuts placed upon each leg above and below the plate *p*, which may thus be placed higher or lower upon the screwed legs, and adjusted so as to relax or tighten the spring *o*, as required. The membrane *j*, *j*, not being strained or stretched quite tight over the ring *k*, *k*, is capable of a certain degree of elevation and depression when the disc *l*, *l*, is raised by the action of the helical spring *o*; the membrane *j*,*j*, is likewise elevated, spreading with much evenness and smoothness over the convex surface of the disc *l*, *l*, pressed against it, into the position shown.

At the same time, and by the same action, the arm of the lever *d*, is raised, and the flat plate or slider *h*, moved back, and kept clear from the slit or aperture *f*, so as to expose the whole thereof, and leave the passage of the gas through it entirely free.

The said aperture or slit *f*, must be always of sufficient size to allow the requisite quantity of gas to pass at the lowest pressure made use of in practice. The helical spring *o*, is tightened by means of the screwed nuts on the wires or legs *q*, *q*, until it presses against the metal disc *l*, *l*, and membrane *j*, *j*, with force just sufficient, and no more, to prevent their being depressed when the gas enters and passes through the body of the apparatus, at such a degree of pressure as will cause it to issue from the openings or burners with that degree of velocity which is necessary to support the height of flame ordinarily required.

Now, if the pressure of the gas becomes from any cause increased, so that it would pass to the burners actually in use, and issue from them in a greater quantity, and with greater velocity than before, the gas in the body of the instrument immediately presses with increased force upon the membrane *j*, *j*; which pressure, by means of the disc *l*, *l*, is communicated equally, steadily, and fully to the

helical spring *o*, and thereby depresses or contracts it; and by the same movement the disc *l*, *l*, draws down the rod *m*, lowers the end of the lever *d*, and carries the plate or slider *h*, forward over the aperture or slit *f*, so as partially to close or obstruct the same, and diminish the opening through which the gas enters into the apparatus, to such a degree as to diminish the quantity which would otherwise pass through the opening or slit *f*, until the pressure within the body of the apparatus, the supply to the burners, and the velocity with which it will flow or issue from them, and, consequently, the height of flame are restored to their original state, or nearly so. When, on the other hand, the pressure of the gas in the pipe of supply and in the body of the apparatus becomes, from any cause, again diminished, then the spring *o*, immediately rises or expands again, and by means of the disc *l*, and rod *m*, raises the arm *d*, and draws back the plate or slider *h*, from the face of the slit or aperture *f*, whereby a larger opening is exposed, and a freer passage allowed to the gas, proportionate to the intended regulation.

The apparatus will effect the regulation required, whether the inequalities of pressure are occasioned by an increased or decreased consumption at the burners, or by an increased or decreased pressure in the pipe of supply. The effect above described could not possibly be produced in the manner set forth, unless the spring *o*, exerted an uniform unvarying force or pressure (or very nearly so) against the disc *l*, *l*, and membrane *j*, *j*, during the whole extent of the movement required from it; which force should be exactly equal to the force exerted by the gas within the body of the instrument upon the membrane *j*, *j*, when the pressure is precisely that which causes the gas to be supplied to, and issue from the burners at the velocity and consequent height of flame desired: for it is obvious that if the

force or tension of the spring *o*, increased in proportion as it were depressed, the gas entering through the slit *f*, could not, on increase of pressure, depress it to any given point, or keep it so depressed until the gas within the body of the instrument had also acquired and maintained a correspondent increase of pressure or tension, which would inevitably increase the supply to, and the velocity at which the gas would from the burners. But if the force exerted by the spring *o*, against the disc *l*, *l*, be uniform during the whole of its required movement, it is equally plain that whenever an increase of pressure on the gas passing through the apparatus to the burners takes place, it will immediately cause the spring to contract, and the plate or slider *h*, to go on moving over the aperture *f*, until the opening is so much diminished that no more gas can enter them, is sufficient to counterbalance the force exerted by the spring upon the disc *l*, *l*, which being invariably the same, notwithstanding the change of position, the supply to the burners, and the velocity at which the gas issues from them, and, consequently, the height of the flame continues the same, or nearly so; and at this point it will stop, until another increase or diminution of pressure takes place.

This uniformity in the force exerted by the spring *o*, during the whole movement required from it, is obtained by using a long and weak helical spring considerably compressed. I do not avow that the force is absolutely, but relatively uniform, and so nearly so, as to be quite sufficient for all practical purposes required. Neither do I think it would be easy, if possible, to give to the spring sufficient uniformity of force, if the movement or extent of contraction and expansion required from it was considerable; but by using the arm *d*, and the plate or slider *h*, in manner above described, a sufficient regulation may be obtained with a comparatively small movement of the spring *o*, by

increasing the length and size of the slit or aperture *f*, and of the plate or slider *h*, without altering the length of the arm *d*, or any of the other parts more than may be found convenient; thus obtaining a considerable range of regulation with a small movement or contraction, and expansion of the spring *o*. Such movement or contraction, and expansion, thus being easily kept within those limits, wherein, by the means above mentioned, it is practicable to obtain an uniformity of force or tension, or as nearly so as suffices for the above purposes in practice.

I do not mean or intend hereby to claim as my invention, the general application of the varying pressure of the gas in its passage through the apparatus to regulate its supply, but only the particular methods of employing it, herein shown and described; and although the valve formed by the slit *f*, and the plate or slider *h*, in manner above described, is the best adapted for the purpose of any I have hitherto tried, I do not mean to confine myself to that form of valve, but to use any other which may, under different circumstances, be found more convenient to effect the regulation required by means of a spring, exercising an uniform force throughout its motion; a disc, membrane, rod, and a lever, enabling the valve to have a considerable range with a small movement of the spring, as above described. Neither do I mean to confine myself to a helical spring (although I have hitherto found it the best adapted to my purposes), but to use any other form of spring which can be made to exercise an uniform pressure against the disc *l*, *l*, throughout the entire movement required from it. Neither do I mean or intend hereby to limit or confine myself to the employment of any particular material or materials, in the construction thereof, but to use any which are fit and proper for the purpose. Nor do I mean or intend hereby to limit or confine myself to any particular

size of this apparatus, but to proportion the same according to the greater or lesser number of the burners to be regulated by it.—[*Inrolled in the Inrolment Office, July,* 1838.]

To John Chalklen *and* Thomas Bonham, *of Oxford-street, in the county of Middlesex, water-closet manufacturers, for their invention of an improvement or improvements in the instruments or apparatus commonly called or known by the name of vices.*—[Sealed 14th March, 1836.]

Our invention consists in the application of certain spherical surfaces to vices, whereby the strain on the screws is more equally and advantageously brought into action, as will be hereafter fully described.

Plate V., fig. 1, is a side view of a hand vice; fig. 2, is a side view of a bench vice, having our improvement or improvements applied thereto; fig. 3, is the screw of the hand vice, shown separately, and fig. 4, is the washer for the hand vice, shown separately: this washer, it will be seen, is of a portion of a sphere, which lying in a recess formed in the chap of the hand vice of the same figure as the washer; and it is the working of these two spherical surfaces, and the constant adjustment of the bearing thus formed, which causes the strain to be equal all round the screw; fig. 5, is the screw and screw box, shown separately, of a bench vice; and fig. 6, is the washer of a portion of a sphere, similar to that described for a hand vice. In each of these figures the same letters indicate similar parts: *a, a,* are the chaps of the vices; *b, b,* the washers, which, as before stated, are of a spherical form, and, consequently, whatever position the vices are open to, the

strain on the screws will be equal to all sides, and not on one part of the circumference only, but all round, owing to the universal joints or bearing obtained by the spherical figure of the washers *b*, and the receiver in the chaps *a*, *a*, of the vices; *c*, *c*, are heads or ends of a portion of a sphere to the screw of a hand vice, and to the screw box of a bench vice. These spherical surfaces also assist in allowing the screws of the vices to have movement, and thus to adjust themselves to whatever degree the chaps *a*, *a*, are opened, and still retain the parts in such a condition as to ensure a direct strain on the screws, and equally all round their circumference.

Having thus described our invention, we would have it understood that what we claim as our invention, is the application of the spherical surfaces to vices as above described.—[*Inrolled in the Inrolment Office, September*, 1836.]

To ARTHUR DUNN, *late of Stamford-hill, in the county of Middlesex, gentleman, and now chemist to the Real del Monte Mining Company, for certain improvements in the manufacture of soap.*—[Sealed 24th August, 1838.]

THIS invention consists, first, with reference to soaps generally, in boiling or heating the ingredients of which they are to be composed or manufactured in close or covered steam-tight vessels, so that the saponifying process may be performed under steam pressure, and at temperatures exceeding the ordinary boiling points of the aforesaid ingredients, when they are mixed together and exposed to heat in open vessels, in the ordinary process of soap boiling; and, secondly, with reference to those soaps in particular, of which silica is to form a component part, my

invention consists in placing silica, or materials containing silica, in the high-pressure boiler with the other ingredients, as hereinafter stated, or in dissolving silica with caustic alkaline lees in a steam-tight vessel or digester, at a high temperature and under steam pressure, and thus producing a silicate which may be mixed afterwards with the ingredients hereinbefore alluded to (when required to make silica soap), as hereinafter described; and, whereas, the manner in which my said invention is to be performed is as follows:—

I take the ingredients for making soap, and in the usual proportion, say, for instance, in order to make common yellow soap, seven hundred weight of tallow, three hundred weight of palm oil, three hundred weight of resin, and about one hundred and forty to one hundred and fifty gallons of caustic soda lees; specific gravity, about 1·10, or containing 11·5 per cent of real soda, and place the whole in a steam boiler, such as shown in Plate VI., at fig. 7. The boiler should be furnished with a man-hole, safety valve, and all the ordinary appendages of such an apparatus, with a thermometer plunged in a mercury chamber. There should be a feed pipe as at *a*, and a discharge pipe as at *c*, through which the soap may be discharged into a pan or frame as at *d*. The fire being lighted, the pressure on the valve should be such as to allow the temperature in the boiler to rise gradually to about three hundred and ten degrees of Fahrenheit; when it has remained at this heat for about one hour, the ingredients may be discharged from the boiler into the pan or frame, and allowed to cool down, when the process of saponification will be found to have taken place.

I will now proceed to describe the manner in which I dissolve the silica, when I am about to make silica soap with silica in that state, and which I do previous to adding

it to the other ingredients, whereby I am enabled to determine the quantity of silica to be contained in the soap, or sufficiently so for all practical purposes.

This, which constitutes my second head of improvement, consists simply in putting silica, whether in the state of ordinary black flints, broken to the size of half a cubic inch, or thereabouts, or in combination with other substances with caustic alkaline lees, in the proportion of about one hundred weight of silica to one hundred gallons of lees, of the specific gravity of about 1·10 in a steam-tight boiler, with apparatus such as hereinbefore described, and heating the same to a temperature above the ordinary boiling point of such lees (say about three hundred and ten degrees of Fahrenheit), keeping the ingredients under steam pressure of about fifty or seventy pounds on the square inch, for about three or four hours, when it is discharged and cooled down; and I obtain a silicate of soda or potash, according to the alkali used in solution, the strength of which can be ascertained by chemical analysis; and this solution, when silica soap is to be made, may be added in any quantity to the other ingredients when in the pan or frame, after they have undergone the saponifying process before described, and before they cool down dependant on the per centage of silica required to be in the soap.

Now whereas, I claim as my invention, first, performing the saponifying process of soap making, by heating the ingredients of which the soap is to be composed, in a steam-tight boiler as aforesaid, at the increased temperature aforesaid, and under pressure as aforesaid; and, secondly, digesting silica in a similar boiler at a high temperature and under pressure aforesaid, and then mixing it with the other ingredients in the pan or frame as aforesaid, whereby I am enabled in the first case to cause the perfect

combination of the ingredients required for making soap in a much shorter time, with less waste and at a less expense than heretofore; and, in the second case, to cause silica to combine more readily with soap, and to ascertain more accurately the quantity of silica to be contained in silica soap; and such my invention, being to the best of my knowledge and belief entirely new, and never before used in that part of her Majesty's United Kingdom of Great Britain and Ireland called England, her dominion of Wales, or town of Berwick-upon-Tweed.

I do hereby declare this to be my specification of the said invention, wherefore I do hereby claim to maintain exclusive right and privilege to my said invention.—[*Inrolled in the Inrolment Office, February,* 1839.]

To JAMES NASMYTH, *of Patricroft, near Manchester, in the county of Lancaster, engineer, for his invention of certain improvements in machinery, tools, or apparatus for cutting and planeing metals and other substances, and in securing or fastening the keys or cottars used in such machinery, and other machinery where keys or cottars are commonly applied.*—[Sealed 20th September, 1838.]

THESE improvements in machinery, tools, or apparatus for cutting or planeing metals and other substances, and for fastening the keys or cottars used in such machinery, and other machinery where keys or cottars are commonly applied, consist, firstly, in a novel and peculiar arrangement of mechanism, or construction of apparatus for the purpose of cutting or planeing mortices or slots in metals and other substances, such as key-grooves or beds in the eyes or bosses of wheels, and all other situations where such or similar work is to be performed.

The main feature in such improved construction of the above description of machinery, is the peculiar situation of the bed or table upon which the work to be operated upon is placed. In all ordinary morticing, slotting, key-grooving, or paring engines, the cutting tool has been made to descend to its work by being supported in suitable bearings above the table, and has also had its motion given by gearing, and the necessary driving apparatus also situated above the table of the engine, which have necessarily limited the extent of work or the diameter of the wheels to be operated upon, besides making the machine or engine of unwieldy dimensions, and exceedingly unsteady in its operation. These inconveniences are entirely obviated by the improved arrangement and novel construction of such machinery claimed under this patent; and the table upon which the wheels or other work to be submitted to the operation of the cutting tool is placed uppermost, and above the whole of the other necessary parts and driving apparatus of the machine; and the cutting tool is caused to rise and fall to perform its office, by being mounted in a central shaft or spindle rising through the middle of the table, and being drawn down to its work by a suitable arrangement of mechanism.

And secondly, with respect to fastening keys or cottars used in such machinery, and other machinery where keys or cottars are commonly applied, my improvement consists in perforating the tail or smaller end of keys or cottars with a number of small holes in a line, placed equidistant from each other; and after the cottar and gib have been drawn up tight, a small coil of wire is to be wound round the cottar and passed through the holes, until the end of the coil bears against the link, strap, or other situation where the cottar may be placed, the last coil or extreme end of the wire being made of a greater or lesser pitch

(the lesser being the best) than the other coils; so that, in tightening up the cottar by turning the coil of wire, the extreme end shall bear against the space left between two of these holes, and thus prevent the coil from being shaken or forced back, and entirely secure the key or cottar from being displaced by any vibration or concussion of the machinery.

In order that these improvements may be more definitely explained and better understood, I have attached to these presents a sheet of drawings, and marked similar letters of reference upon corresponding parts of the mechanism in all the figures.

Plate VI., fig. 1, is a front or side elevation of my improved machine; fig. 2, a plan or horizontal view, as seen from above; fig. 3, an end view; and fig. 4, a vertical section, taken through about the middle of the machine. The main or principal framing of the machine is shown at *a, a, a, a,* having a V or other shaped groove *b, b,* formed upon the top; in this groove *b,* the bed *c, c,* is supported by means of the V edges *d, d*: another bed or table *e, e,* is placed above the bed *c, c,* and moving in angular slides in a rectangular position to the V groove *b, b*; and thus any width or depth of cut may be given to the cutting tool. Above these two sliding beds, the main or work table *f, f,* is placed, being the uppermost part of the apparatus, and having mortices *g, g,* formed around it, for the purpose of fixing or securing the work while under the operation of the cutting tool. This table or bed *f, f,* has notches *h, h,* also formed around its periphery, for the purpose of fixing the table in any position by means of the catch or holdfast *i, i,* as the table is turned upon its central boss *k, k,* in cutting any number of key grooves around the edges of wheels or otherwise. The cutting tool is shown at *l,* mounted in the upper end of the shaft or spindle *m, m*:

this shaft is keyed into another shaft or bar *n, n,* having angular planed sides, and moving in corresponding bearings *o, o,* in which it is supported. This shaft or spindle *m, m,* carrying the cutter, may be shifted and varied in its diameter, according to the hole in the wheel under operation. A vertical reciprocating motion is given to the cutter *l,* by means of a driving strap being passed round the speed pulley *p,* which being fixed upon the end of the driving shaft *q,* and carrying the pinion *r,* at its other end, drives the spur wheel *s,* carrying the crank plate *t,* and crank pin *u.* The crank pin *u,* is attached to the upper end of the connecting rod *v, v*; and the lower end of this rod is attached by a pin and sliding boss *w, w,* to the lower end of the shaft *n*; and being made fast by the tightening screw *x,* it will be evident that as the crank pin *u,* revolves, the cutting tool *l,* will thus perform the necessary action.

In order that the work under operation shall make the necessary progressive action to obtain the whole depth of the cut desired, the same shaft *y,* upon which the spur-wheel *s,* is mounted, also carries an excentric *z,* which revolving between the forked arms 1, 1, of the lever 2, will give motion to the shaft 3, upon which the other end of this lever is keyed. Another lever 4, being also keyed to this shaft 3, raises the connecting link 5, and thus vibrates the ratchet or catch 6, at every revolution of the excentric. As this catch 6, is kept fast by its tail spring in the space between the teeth of the spur-wheel 7, and that wheel keyed upon the boss 8, having a nut formed upon its interior, driving the screw 9, which is fixed in the bed *c, c,* will thus slide the table *e, e,* upon its V edges, and advance the work to the cutting tool at every descent of the same. A similar action may be given to the table carrying the work, but in a rectangular position to the one just described, by means of the connecting link 10, also attached at its lower

end to the excentric rod or lever 2, which will thus vibrate the click or ratchet 11, and cause the ratchet wheel 12, to advance one or more teeth at every revolution of the excentric; and by means of the nut 13, driving the screw 14, the upper table will be caused to slide in its angular edges, and thus advance the work to the cutting tool. Any slight degree of draft or taper may be given to the mortice or key groove desired, by raising or lowering the set screws 15, 15.

The improved method of fastening the cottar or key in this and all other machinery, is shown at the upper end of the connecting rod *v*, *v*, and the coil of wire 16, wound in its proper position through the small holes perforated in the tail or end of the cottar. This contrivance is also shown detached, and upon an enlarged scale, at figs. 4, and 5. It will be evident to persons conversant with such machinery, tools, or apparatus for cutting or planeing metals and other substances above described, that it would be advisable in large machines designed for heavy work, that the whole of the apparatus should be placed in a pit or chamber, and that the surface of the upper table to receive the work should be level with the ground line, so that any work of almost any dimensions may be easily brought under the operation of the cutting tool.

Having now particularly described my said improvements, I desire it to be understood that I claim as my invention, the peculiar arrangement and construction of such or similar machines or engines, as above described and shown in the drawings annexed, and having the table or bed for the work upon the top, or above all the other mechanism; and also in the above described mode or method of fastening or tightening keys or cottars in such machines, and in all other machinery or situations where keys or cottars are commonly applied.—[*Inrolled in the Rolls Chapel Office, February*, 1839.]

Specification drawn by Messrs. Newton and Berry.

To PETER FAIRBAIRN, *of Leeds, in the county of York, machine-maker, for his invention of certain improvements in the machinery or apparatus for roving, spinning, doubling, and twisting cotton, flax, wool, silk, or other fibrous substances.*—[Sealed 22d June, 1838.]

THESE improvements in the machinery or apparatus for roving, spinning, doubling, and twisting cotton, flax, wool, silk, or other fibrous substances, consist in a certain arrangement of machinery by which I am enabled to drive two rows of spindles by one horizontal shaft, and also to give the taking-up motion to two rows of bobbins by another horizontal shaft. This contrivance is applicable to various constructions of machinery for roving, spinning, twisting, and doubling cotton, flax, wool, silk, and other fibrous materials; but the essential features of my improvement will be fully understood by the accompanying drawing, which represents parts of a roving frame.

Fig. 1, Plate V., is an elevation of a portion of the front of a machine, called a regulating roving frame, exhibiting several spindles, with bobbins and flyers mounted thereon; *a*, *a*, being a series of spindles placed in the front row, and *b*, *b*, similar spindles placed in the back row; fig. 2, is a section taken transversely through the roving frame, showing the situation of the front row of the spindles *a*, and the back row *b*. The pivots of these rows of spindles are supported in steps upon the back and front foot or step rails *c*, and *d*, and are kept in their vertical positions by collars *e*, *e*, inserted into the two spindle rails *f*, and *g*. Upon the lower part of each spindle, a worm or oblique toothed pinion *h*, is affixed, which pinions severally take into corresponding worm or oblique toothed wheels *i*, *i*, *i*, fixed upon the horizontal shaft *k*, passing longitudinally through the machine between the two rows of spindles. Hence, it will be perceived that by giving rotary motion to the shaft

k, by any of the ordinary means, all the spindles, with their flyers, in the two rows will be driven.

A moveable frame or carriage *l, l*, is mounted in the machine, answering the purpose of a copping rail for raising and lowering the bobbins *m, m, m*: this frame *l*, is to be moved up and down by any of the ordinary mechanism by which traverse motions are effected, and, therefore, I do not consider it necessary to show that part of the machine, as it will be well understood by spinning machine makers.

The spindles pass through collars *n, n*, in the sliding frame *l*, and also pass through loose sockets *o, o*, supported by the collars *n*, upon the upper parts of which sockets the bobbins *m*, respectively bear. At the lower part of each socket an oblique toothed pinion *p*, is affixed, which pinion takes into a corresponding oblique toothed wheel *q*, on the horizontal shaft *r*, mounted in the sliding carriage. The movements of the sliding carriage *l*, and the rotary motion of the shaft *r*, being effected by similar means to those usually employed for working the bobbin, lifting rail, and shafts in regulating roving frames, it will be perceived that the bobbins will be turned independently of the spindles, and, consequently, that any taking-up motion may be given to them which circumstances may require, and that governed by a differential movement suited to the increasing diameter of the rovings winding on the bobbins.

Having now described the particular features of my improvements in the machinery or apparatus for roving, spinning, doubling, and twisting fibrous materials, as adapted for regulating roving frames, I desire it to be understood that I do not intend to confine the adaptation of my invention to that particular construction of machine; but I claim the adaptation of the wheels and pinions in the manner shown, to the driving of all descriptions of roving, spinning, doubling, and twisting machinery in which spin-

dles or bobbins, or both, are driven by toothed gear in one, two, or more series.—[*Inrolled in the Rolls Chapel Office, December*, 1838.]

Specification drawn by Messrs. Newton and Berry.

To Augustus William Johnson, *of Upper Stamford-street, in the parish of St. Mary, Lambeth, in the county of Surrey, gentleman, for an invention of certain improvements for preventing the incrustation of steam boilers or generators, or evaporating vessels; being a communication from a foreigner residing abroad.*—[Sealed 30th June, 1838.]

This invention consists, firstly, in the use and application of vegetable matter or extracts, which being thrown into or infused in the water with which the boiler, steam generator, or other vessel is supplied, by a chemical action, lays hold of, and envelopes in a thin coat or film, all the earthy, calcareous, and metallic or other particles which are held in suspension, or may be produced or developed in such water by the action of heat. The adhesion or affinity of such particles to each other is thus destroyed or intercepted, and by that means their adhesion to the sides and bottom of the boiler or other vessel (which when it occurs, constitutes what is commonly called incrustation of boilers) is effectually prevented. All kinds of vegetable matter or extract, either in a solid, pulpy, or liquid state, may be used indiscriminately; but I prefer the extract of such vegetable substances as contain and give out the greatest quantity of colouring matter, such, for instance, as logwood and other dye-woods, bark or tan, and grasses of every description, whether in a fresh, dry, or decayed state. I also particularly recommend the use of decayed

or putrified vegetable matter in general, such as turf, peat, manure, leaves, and other substances of that kind. In short, I declare the essential principle of this part of the invention to be the impregnating with vegetable matter or extract the water used for the purposes above alluded to, whereby the tendency of the earthy, alkaline, metallic, and other particles held in suspension or solution in the water to adhere to each other is counteracted, and the incrustation of the boiler or other vessel prevented in the way above stated.

The mode of applying this first method for preventing the incrustation of boilers, and the proportion of vegetable extract to be infused in the water, must depend upon and vary according to circumstances, and the natural properties of the water made use of. In all cases where it is practicable, I should prefer the infusion or admixture of the vegetable substance or extract with the water to be effected, in the tank, reservoir, or supply-channel from which the boiler or other vessel is fed; and such infusion or admixture would be very easily and effectually accomplished by causing the water to flow over or filter through a truss or bundle of hay, grass, rushes, roots, or such like vegetables.

Another easy mode of infusing vegetable extract in the water, and which, from experience, I have found to be most efficacious, is to obtain a decoction of logwood or any other cheap dye-wood or vegetable colouring matter, and mix it with and into the water in the tank, reservoir, or supply-channel above referred to. In many cases, however, it would in practice be difficult or inconvenient to infuse the vegetable extract or matter into the water before its introduction into the boiler. In all such cases two modes of introducing the vegetable matter or extract into the boiler may be had recourse to: the first is to inject, by means of

a small pump or syringe, a strong decoction of vegetable colouring matter into the boiler or feed-pipe of the boiler, in a certain proportion with the supply or feed of water; the second is to throw into the boiler, at intervals of a few days, as the working of the engine or other circumstances may render convenient, pieces of logwood or other dye-wood, or concentrated solidified extract of vegetable dyes, in sufficient quantity to produce the desired effect for a given number of days.

The proportion in this case, as in all the others previously referred to, of vegetable extract or matter to be infused, injected, or introduced into the water, must vary considerably, as already stated; but a general rule may be laid down, that to prevent the incrustation of boilers by this, my first method, the effect of any of the above described modes of infusion will be produced if the water is discoloured in a perceptible degree; and it may be well to state, that an excess of vegetable extract or colouring matter mixed with the water, cannot destroy or counteract the effect intended to be produced, but, on the contrary, will materially assist and promote it.

Having now fully described my first method of preventing the incrustation of boilers, &c., I have to observe that it is chiefly applicable to the use of fresh water, and shall proceed to describe my second method, which may be indifferently applied to boilers fed with fresh water, and to those fed with salt or sea water. This, my second method, consists in the use of broken glass, coarsely pounded, which is to be introduced into the boiler or other vessel above referred to; and being kept in a state of constant agitation by the circulation and ebullition of the water, will continually scour or cleanse the bottom and sides of the boiler, so as to render the adhesion or incrustation of any deposit thereunto. It is evident that the action of the broken or

pounded glass, in the way described, is merely mechanical, and the same effect may be produced by other substances in an analogous state, such as broken flints or stones, broken porcelain or earthenware, small scraps of iron, tin plate, copper, zinc, or other metal, shot, shells, or any hard substance in small fragments insoluble in water. For particular vessels, such as salt evaporators, sugar pans, and other purposes where the use of broken glass, and the fragments of other substances, would be inconvenient, I recommend the use of earthenware, metal, glass, or other balls, of different sizes. Now, the application of this, my second method, is limited to boilers of a certain construction, in which the broken glass or other substances can circulate freely, and be brought in contact with all those parts of the boiler on which the fire acts; and I think it right to state, that with certain tubular boilers the effect would be incomplete.

It now remains for me to describe my third and last method for preventing the incrustation of boilers, which, as it effects or modifies the construction of the boiler itself, I annex the drawing shown at Plate VI., figs. 8, and 9, which will be sufficient to explain the application of this third method, the same letters of reference being marked upon corresponding parts in both figures. Fig. 1, shows the application to a common waggon-shaped boiler; and fig. 2, the same, adapted to a cylindrical boiler: A, is the boiler; B, a small external boiler or vessel, of sufficient strength to resist the pressure in the boiler A, and communicating therewith by means of the pipe or tube *a*, *a*; and although only one external boiler and pipe of communication are represented in the annexed plan, two or more of both may be used, or a communicating pipe with tubes in a fork-like form, as represented in fig. 2: *b*, is a steam-tight valve, which can be opened or shut at pleasure, and by closing

it, the communication between the principal boiler A, and the external boiler B, may be intercepted: *c*, is a cock to draw off the contents of the external boiler B; *d*, is the man-hole to the same. The pipe or tube *a*, rises up into the boiler A, but its upper orifice must always be below the level of water in the boiler A, to which boiler the fire is only applied, the external boiler B, not being in contact with the fire. When, by the effect of heat, the agitation of the water takes place, by a well-known law the particles suspended in the water seeking that part of the boiler which is in the most quiescent or rather the least agitated state, which will be the case at the upper orifice of the tube *a*, the particles will successively deposit themselves therein, and falling down the tube, will settle at the bottom of the external boiler B: thus will the principal boiler A, be kept almost entirely free of deposit, and the incrustation therein prevented. When a considerable quantity of deposit shall have formed in the external boiler, it may be cleaned out by closing the valve *b*, and drawing off the contents thereof by the cock *c*, which may be assisted by opening the manhole *d*. To re-establish the communication between the principal and external boilers, it is only necessary to fill the latter with boiling water, and after closing the cock *c*, and the man-hole *d*, to open the valve *b*, and so continue the operation.

Having described this invention, and the manner of carrying the same into effect, I would, in conclusion, state, that I claim as a new invention or discovery for preventing the incrustation of boilers, firstly, the systematic use or application in the mode above described of vegetable matter or extract, in order to corrupt, colour, and filter the water used in boilers, &c.; and afterwards, by a natural process on the application of heat, to prevent the adhesion to each other, or to the boiler, of the particles held in suspension in

the water; secondly, the use of broken or pounded glass, or other hard or insoluble substances, which being agitated by the circulation and ebullition of the water and other liquids, will cleanse or scour those parts of the boiler with which they come in contact; thirdly, the combination by which one or more tubes or pipes in the boiler are made to communicate with outer boilers or vessels, together with a contrivance for cleansing the outer boiler or vessel without stopping the action of the principal boiler or generator. The use of a pipe or pipes, and of vessels placed inside the boiler to receive the deposit of the earthy, calcareous, and other particles is well known, and has already been applied; but the combination and contrivance for collecting all the deposits in an external boiler or vessel, and the mode of cleansing the same, as described in the annexed plan and above description, I believe have hitherto never been practised, and I, therefore, claim the same as being a new invention.—[*Inrolled in the Rolls Chapel Office, December*, 1838.]

To JEREMIAH BYNNER, *of Birmingham, in the county of Warwick, lamp-manufacturer, for improvements in lamps.*—[Sealed 9th December, 1837.]

THIS invention relates to the mode of supplying air to the flames of lamps, by which a greater strength and steadiness of flame, and brilliancy of light, is obtained from such flames. The improvement consists in the application of certain surfaces, called by the Patentee "reflecting surfaces," in combination with glass chimneys of a peculiar construction, whereby currents of air are caused to act on a certain part of the flame above the points of ignition; and such currents of air are deflected in such a manner

that they have a tendency to infringe on the flames, and would, if only applied to one side of the flame, cause it to be blown down into a horizontal position; but as the currents of air, according to this invention, are deflected on to the flames of lamps equally on all sides, a steadiness of flame and brilliancy of light is produced, which is not attainable by other modes of applying air thereto. It is important that particular attention be paid to the circumstance of the currents of air so deflected, having a tendency to cross the flame at all points, being deflected or caused to strike above the points of ignition, because it is important that the flames should be formed below the point at which the currents of air strike.

Plate VI., fig. 10, represents a section of the burner of an argand lamp, with a glass chimney attached thereto; *a*, is the burner; *b*, the deflector; and *c*, the chimney, both supported by a gallery *d*. It will be seen, by reference to the figure, that the point of ignition is considerably below the point at which the currents of air impinge upon the flame; and it is this, and this alone, which constitutes the invention: conical surfaces, or deflectors, as they are called by the Patentee, have been before used, but they have generally been constructed in such a manner that the air has been impinged upon the flame exactly at the point of ignition. The improvements in the construction of chimneys, consist in forming the chimney as shown in the figure, that is, narrower at the upper part than at the lower, so that a central current or draft of air above the flame may be produced; and it must be observed that there are no openings for the admission of air to the chimney, except through the deflector, and the upper or narrow part of the chimney is sometimes formed of metal.

The Patentee says, in conclusion, he does not lay any claim to the various parts of lamps shown; and he would

have it understood that he is aware that various modes of supplying and regulating air to the burners of lamps have been resorted to; he does not, therefore, claim any other mode of accomplishing that object, than that in which the currents of air are obtained, at a point below the point of ignition, and conducted up and deflected off in a direction to cross the flame on all sides, at a point above the point of ignition, as above described; and he also claims combining the deflectors with chimneys of the construction shown and described.—[*Inrolled in the Inrolment Office, June,* 1838.]

To RICHARD GOODWIN, *of St. Paul's-terrace, Camden-town, in the county of Middlesex, coal-merchant, for his invention of an improved prepared fuel.*—[Sealed 26th April, 1838.]

THIS invention of an improved prepared fuel, consists in mixing or combining certain materials (which in themselves are nearly useless), in various proportions, so as to produce, when combined, a cheap and good fuel. The composition consists of the undermentioned articles, and is combined in the following proportions:—Seven parts of fuller's earth, or strong blue clay or loam, such as is, or may be, found in abundance in the neighbourhood of London, or the sediment, mud, or loamy earth from the banks or bottoms of rivers, canals, moats or ponds; two parts of coal tar, or pitch, or Stockholm tar; eight parts of small bituminous coal, such as will pass through a quarter inch sieve (and which of itself is comparatively of no use for domestic purposes); three parts of mire, mud, or scrapings from the public highway roads, whether

Macadamized or paved, as in London. In combining these ingredients, I use the following method:—first, I make a layer of fuller's earth, blue clay, or loam, or the sediment, mud, or loamy earth from the banks or bottom of a river, canal, moat, or pond. I then take one of the two parts of coal tar, pitch, or Stockholm tar, and make a layer of it by pouring it on the before-named seven parts of fuller's earth, or clay, after which I take the eight parts of small coal, with which I make a layer upon the former; I then make another layer, consisting of the mud, mire, or scrapings of the public highway roads, and add, lastly, the remaining one part of coal tar, pitch, or Stockholm tar. If the mud, mire, or scrapings be in a fluid state, it will most probably contain sufficient water for the perfect mixing of the whole; but if nearly dry, a sufficient quantity of water must be applied to cause the whole of the materials to amalgamate. I then have the whole turned over with a shovel or other suitable instrument, and thus mixed; and afterwards, for the more perfect incorporation of each component part with the other, I grind the whole in a mill, actuated by horse, steam, or other power, the mill being constructed on a similar principle to those used for grinding or mixing brick earth or mortar. The whole being thus thoroughly compounded, and reduced to about the consistency of clay prepared for tile-making, it may be formed or made into any convenient shape by the hand, or in a mould, and afterwards dried in the same manner as bricks, and when hard, the fuel will be fit for use. I would here notice, that when the fuel is about half dry, it is susceptible of compression, and may be reduced from the original size full one-sixth or more, still retaining its full strength as a fuel, which I believe to be equal to that of Merthyr coal, and spreading in its flame to that of Hartley

Main; and, consequently, it presents to the steam navigator most incalculable advantages in the saving of stowage, to the extent of at least one-third.

I use the fuller's earth, blue clay, or other such earthy materials, as before named, for binding or holding the other matters together.

I most distinctly claim the use of road mud, mire, or scrapings of the highway roads or streets, as applied to the manufacture of fuel, as my invention or discovery; and consider the use of the same as a component of fuel, as an invaluable discovery, inasmuch as the said mire or mud is in itself inflammable and combustible, as it contains iron and steel in very small and innumerable particles, which is perpetually being chafed from the shoes and shoe-nails of horses, and from the tiers of carriages of every description: this brought into collision with flint stone (with which this mud and mire also abounds) of themselves produce fire. And the mineral and vegetable parts and qualities of this part of my improved fuel, I consider to be in their very finest state of applicability for burning purposes, not having been washed of their native strength in the common sewers, nor finally deposited in the river, where it becomes mud, necessarily exhausted of its greatest strength and finest qualities by the flowing and ebbing tides, and constantly in an almost state of inundation, which is well known to be ruinous to the very best and strongest coal produced in the kingdom.

The coal I use being all small, is with a view to its entire incorporation with the other materials, and to bring it into the most important use, in giving or imparting to the fuller's earth, clay, or loam, a moulding tendency, reducing it to ashes. The unctuous qualities of tar or pitch are so great, that in being well mixed with fuller's earth, clay, or loam, it becomes, when lighted, a kind of cemented

body of fire, and in like manner also diffuses its bituminous power in the mire or mud. The qualities of the road or highway mud or mire are peculiar and most important: first, it gives to the fuller's earth, clay, or loam, an additional readiness for crumbling into ashes when submitted to the action of fire, instead of its forming a hard substance or kind of stone or brick in the fire; the grit of stone and sand in the mud or mire occasions this, in a great degree, loosening or separating the glutinous or binding qualities of the fuller's earth, clay, or loam; also, the pulverized iron and steel it contains, gives to this fuel an intensity of heat which I believe is not found in any coal. The vegetable matter this mud or mire also contains, such as corn, clover, hay, and straw, after the partial decomposition it undergoes, before it forms a part with the other numerous ingredients, vegetable and mineral (found in road mud or mire), added to the well-known bituminous properties of tar, pitch, and coal, produce a superior and economical fuel for all domestic purposes, and in a furnace is quite equal in extent of spreading flame to Hartley Main coal.

In conclusion, I wish it to be understood that I do not claim the exclusive right to use any of the above-named materials (except the road mud or mire) separately; nor do I confine myself to the precise proportions of each, or either article herein mentioned, as they may be under circumstances varied. But that which I claim as my invention is, first, the applying of road mud or mire for the manufacture of an improved fuel; secondly, the combining of the above-mentioned materials therewith, viz., strong blue clay, &c., coal, tar, and small coal being the refuse of their respective kinds in the above-mentioned proportions, or nearly so, whereby the same may be applied to important uses as a substitute for ordinary fuel, both for domestic purposes, and the more important use of generating steam in steam

boilers, for the furtherance of steam navigation, in both of which uses I effect a saving of at least one-third in the room required for stowage, and also in the expense of ordinary fuel.—[*Inrolled in the Rolls Chapel Office, October*, 1838.]

Specification drawn by Messrs. Newton and Berry.

To WILLIAM MARR, *of Bread-street, in the city of London, ironmonger, for his invention of an improved method of making and manufacturing of all kinds of copper, iron, tin, and other metal safes and boxes and repositories, with metal and mineral and other means, so as to afford the most perfect security against fire to deeds, documents, and property contained therein.*—[Sealed 13th February, 1834.]

THE metal safes now in use are constructed of wrought iron, and lined with plate iron, so as to form an air chamber all round the box or safe; and it was supposed that this stratum of air between the two plates would prevent the inner plate or lining from getting sufficiently hot to destroy the property inside the safe, even if the box should be externally subjected to a very intense degree of heat. This, however, the Patentee has discovered to be entirely fallacious, as in several experiments that he has made he has found that the stratum of air has little or no effect; he has, therefore, adopted the idea of filling the space between the outer and inner casing with the most perfect non-conductor of heat that can be obtained, namely, asbestos. This constitutes the whole of the invention, and has been found to answer the purpose admirably. The Patentee lays claim to the application of asbestos, or any other non-conductor of heat, between the outer and inner

casing of safes, boxes, or other repositories for deeds, documents, or other property, whereby such property may be preserved from the action of an intense external heat.—[*Inrolled in the Petty Bag Office, August,* 1838.]

To ANTHONY THEOPHILUS MERRY, *of Birmingham, in the county of Warwick, metal dealer, for his invention of the application of certain white metal plated to certain manufactures, of which it has not hitherto been applied.* —[Sealed 8th March, 1836.]

THIS invention is merely the application of German silver, or any other alloy of nickel, to the manufacture of silver plated goods, so that when the real silver with which the article is plated shall have partially worn off, the edges or worn parts will still present a bright and silvery appearance. As the method employed in carrying the invention into effect is very similar to that now in general use in plating goods, it will not be necessary for us to describe it, especially as the Patentee does not claim it, but confines his invention to the introduction of German silver, or such other white metal in the manufacture of plated goods.—[*Inrolled in the Inrolment Office, September,* 1836.]

To JAMES LUTTON, *of Tudor-place, Tottenham-court-road, in the county of Middlesex, chair-maker, for his invention of certain improvements in castors for furniture.*—[Sealed 25th November, 1834.]

THE improvements set forth in the specification of this patent consist in adding a strengthening arm to the horn

or bracket of the roller, in order that it may be better able to sustain heavy weights.

The invention, which is very simple, will be perfectly understood by referring to fig. 11, Plate VI., which represents a side elevation of a castor: a flange or band *a*, forms the upper rim of the castor, as in the ordinary construction; but in this it will be seen that it is made of considerable strength, in order to resist the upward pressure of a collar *b*, to which is attached an arm *c*; and the lower end of this arm terminates in the horn or bracket of the roller.

It will be seen that this construction of castor must possess very great strength, and will consequently be capable of bearing very heavy weights.—[*Inrolled in the Inrolment Office, May,* 1835.]

To Henry Vint, *of Lenden, in the borough of Colchester, in the county of Essex, Esq., for his invention of improvements in paddle-wheels.*—[Sealed 9th July, 1835.]

This invention is a contrivance which is designed to cause the float boards of paddle wheels to enter and leave the water in such positions that the surface of the water may be but very slightly disturbed, and little, if any, tail water produced.

The manner in which the Patentee constructs his paddle-wheel is shown in Plate VI., at fig. 12, which represents a vertical section taken through the middle of the wheel: *a*, is the frame of the wheel; *b*, the axle or driving shaft; *c, c, c*, the float boards, mounted loosely on axles *d, d, d*. It will be seen that these axles are not placed in the middle of the float boards, but about one-third of the way from their outer edges. This is described as the first part of the invention; the second part consisting in attaching

bridle pieces or shackle bars *e, e, e,* to the float boards, for the purpose of causing them to enter and leave the water at particular angles; one end of each of these bridle pieces or shackle bars is attached to the inner edge of the float board, and the other end to one of the arms of the wheel.

The bridle pieces or shackle bars may be made as shown in the drawing, namely, of five separate links, or of chains or chain cable. The Patentee claims the use of the bridle pieces or shackle bars for causing the float boards to enter and leave the water at a particular angle, and also the placing the axles *d, d, d,* about one-third of the way from the edge of the float boards, so as to cause them to swing loosely on their centres, as above described.—[*Inrolled in the Inrolment Office, January,* 1836.]

[The figure represents the paddles exactly as they are shown in the drawing accompanying the inrolled specification, some of which are obviously in positions that they could not assume when the wheel was revolving; and we do not perceive by what means they are stayed so as to produce the propelling stroke when passing through the water.]

List of Patents

Granted by the French Government from the 1*st of January to the* 31*st March,* 1838.

(Continued from page 62.)

To Hall, Powell, and Scott, of Rouen, for a machine to full cloth.

— Joseph Louis Mangeon, of Paris, for a new macerator without heat.

— Moody March Hall, of Cornich, United States, for a revolving cylinder, applicable to cannons and fire-arms of all kinds.

— Dominique Forest, of St. Etienne, for improvements in the manufacturing of ribbons.

To Marie Jacob Grevelot, of Paris, for improvements in percussion caps.

— Pierre Louis Gagnet, of Fleury sur Andelle, for a new system of harness.

— Louis Guillain Dupont, of Etaves, for a plough.

— François Bernabe Achille Mothes, of Paris, for a preparation called *pectoral nourishing jelly.*

— Poncet, brothers, of Avignon, for a method of extracting from white woods a substance for the fabrication of paper and paste-board.

— Alexandre Benoit Brissac, of Cateau, for a waggon wheel for railroads.

— Henry Selves, of Paris, for a machine called *splérogène*, to make terrestrial and celestial globes of all dimensions.

— Casimir Isidore Silvestre, of Brignolles, for a method of refining sugar.

— Louis George Vasseur, of Chamnes, for a new apparatus for the rearing of silkworms.

PATENTS FOR FIVE YEARS.

To Antoine Perpigna, of Paris, for a new means of producing instantaneous fire.

— Pierre Frederic Alphonse Maillard, of Bazancourt, represented in Paris by Mr. Perpigna, advocate, for a system of wheelwork and geering to be set in motion by animal power.

— Pierre Joseph Jarabel, of Lyons, represented in Paris by Mr. Perpigna, for a frame to make bobbin net.

— Jean Celestin and Jean Justin Régad, of St. Claude, represented in Paris by Mr. Perpigna, for a machine to make tacks and shoe nails.

— Jacques Noel Boneau, of Rouen, represented in Paris by Mr. Perpigna, for an improved loom.

— Pierre Hyppolyte, of Elbeuf, represented in Paris by Mr. Perpigna, for a warping machine.

— Hamond and Co., of Charenton, for a method of constructing the wheels of tram-waggons.

— Charles Philippe Leroy, of Paris, for an improved stove.

To Auguste Cesar Crousse, of Paris, for a method of protecting gentlemen's hats from the effects of perspiration.

— Ambroise Ceremonis, of Paris, for a method of shoeing horses without using nails.

— Berrolla, brothers, of Paris, for a gas-meter with clockwork.

— Jean Croisat, of Paris, for an improved brush.

— Trigant and Pascal, of Paris, for a new kind of beverage, called by them algerine.

— Borgnis-Desbordes, of Paris, for a method of curing smoky chimneys.

— Madame Richard, of Paris, for an improved coffee pot.

— Pierre Narcisse Derlon, of Paris, for a means of preparing capsulas for containing medicinal preparations.

— Chaudron Junot, of Paris, for a means of extracting stearine from palm oil.

— Chaudron Junot, of Paris, for a means of converting flesh into a fatty and gelatinous substance.

— Derfossé and Pascal, of Paris, for decomposing coal by a new process.

— Amedée Antoine Boniface Brémond, for a new method of sticking bills.

— Thomas George, of Paris, for the composition of a grease to be used for lubrefying machinery.

— Jacquinet, junior, of Paris, for an improved fire grate.

— James Gauntley, of St. Quentin, for improvements in the warp frame.

— Jean Baptiste Deregnecourt, of Roubais, for a new winding machine.

— Rambaux, Rateau and Co., of Paris, for a liquid composition, calculated to make the tinning adhere more powerfully.

— Frederic Proeschel, of Paris, for improvements in elastic mattresses.

— Thomas Bedouet, of Paris, for a warming pan.

— Alexis Petit, of Maurienne, for a new fire grate.

— Godemard and Meynier, of Lyons, for an improved machine for weaving figured silks.

— Eugène Bourdon, of Paris, for an improved pump.

To René Jacques Alphonse Regnoust, of Meulan, for an improved belt for ladies.

— Jean Pourrageaud, of Gourson, for a machine for excavating the earth.

— Joseph Celestin Dumonthier, of Houdan, for a new spring for the suspension of carriages.

— Louis Joseph Quenut, of St. Omer, for a new mode of manufacturing boots.

— Antoine Noel Pascal, of Paris, for an improved method of making bricks.

— Joseph Brutus Dambreville, for an improved pump to be used in the navy.

— Jean Felix Gariel, of Elbeuf, for a new fabric made of silk and worsted.

— Bourée, of Boulogne-sur-Mer, for a mechanical washing machine for cleansing animal black.

— Laurent, brothers, of Toulouse, for an improved syringe.

— Joseph Antoine Sonnenthal, of Vienna, in Austria, for a process of manufacturing sugar with pumpkin.

— Jean Baptiste Villet, of Lyons, for an improved hydraulic machine.

— Pierre Denis Fournyhairand, of Paris, for an improved method of manufacturing hats.

— Alexis Bruno Gensoul, of Bagnols, for a machine for preventing, in the winding of cocoons, the adhesion of several silk threads together.

— Jules Leroux, of Paris, for an improved medicine called by him *bols vétérinaires Anglais.*

— Thomas Brunel, of St. Etienne, for a machine for manufacturing cutlery.

— Hippolyte Constant Cheneau, of Paris, for an improved clasp.

— Richard Viltz, of Lyons, for a compass to be used in the cutting out of gentlemen's clothes.

— Devaucouleurs, father and son, of Paris, for improvements in umbrellas.

— John Austin, of Paris, for improvements in the manufacturing of bobbin-net.

To Pereire and Trousseau, of Paris, fer new applications of fused steel.

— Gabriel Lambry, of Chârenton, for a machine for manufacturing leaden pipes.

— Louis Nicolas Hullin, of Paris, for improvements in suspenders.

— François Hubert Fondeur, of Ogny Lignay, for an improved filter for filtering saccharine juices.

— Louis Alexandre Sentis, for improvements in carding and spinning cotton.

— Jean Joseph Napoléon Jourdan, of Paris, for a new cartridge with its detonating primer.

— Charles François Thibault, of Vincennes, for an improved ladder to be used in case of fires.

— Robert Charruy, of Vienne, for a new kind of time-piece.

— Jean Druin, of Paris, for an improved easy chair.

— Antoine Vicherat, of Paris, for improvements in the springs used for closing doors.

— Nicolas Kœchlin, and brothers, of Mulhausen, for improvements in looms.

— Théodore Brandt, of Amiens, for improvements in the manufacturing of pianos.

— Louis Edouard Amedée Souliac, of Paris, for a prepared flannel for curing rheumatisms.

— Louis Anna Nicolas Ligny, of Paris, for improvements in boots and sheos.

— Nicolas Judas Remy, of Paris, for an improved mode of carding wool for mattresses.

— Pierre Giraud, of St. Etienne, for improvements in the machines used for milling silk.

— Comperot and Moncourt, of Paris, for certain apparatus for correcting the deformities of the body.

— Jean Santoni, of Paris, for a means of adapting the percussion system to the guns on the flint and steel principle.

— Jean Joseph Tessière, of Paris, for improvements in axletrees.

— Etienne Caron, of Paris, for a economical means of manufacturing chocolate without using heat.

To Pierre Alexandre Chasseigne, of Paris, for improvements in the cut of gloves.

— Louis Hardouin, of Paris, for an improved steam generator.

— Louis Alexandre Martin, of Orleans, for an improved method of manufacturing artificial stones.

— Joseph Marie Guidicelli, of Paris, for an apparatus called by him *calerigène*.

— Cresson d'Orval, of Paris, for a means of applying sheets of caoutchouc in the making of boots.

— Théodore Hamelaerts, of Paris, for improvements in umbrellas.

— Rossignol, brothers, of Lyons, for a heating apparatus for extracting oil from oleaginous seeds.

— Jacques Marie Hernville, of Paris, for a machine for printing tissues and other fabrics.

— André Marchais, of Paris, for a means of burning plaster of Paris and lime.

— Jean Nicolas Goupil, of Paris, for a new kind of ornament applicable to furniture.

— Baudon Porchez, of Lille, for an improved calefyer.

— Felix Passot, of Paris, for an improved method of applying economically steam to the driving of machinery.

— Daniel Kirk, of Caen, for a new kind of lace.

— Malbec, of Paris, for a kind of pipes called by him *Turkish pipes*.

— Piquet Ainé, of Paris, for an improved pump.

— Roustan, junior, of Marseille, for a new pectoral paste.

— Jean Nicolas Chailly, of Paris, for an orthopedic apparatus with a lateral pressure.

List of Patents

Granted in Scotland between 22d March and 22d April, 1839.

To James Gardner, of Banbury, in the county of Oxford, ironmonger, for an invention of improvements in cutting Swedish turnips, mangel-wurzel, and other roots used for food for sheep, horned cattle, and other animals.—25th March.

To George Cottam, of Winsley-street, Oxford-street, in the county of Middlesex, engineer, for an invention of improvements in the construction of wheels for railway and other carriages.—25th March.

— Richard Roberts, of Manchester, in the county-palatine of Lancaster, civil-engineer, for an extension of seven years from the 5th April, 1839, of a patent granted to him for an invention of an improvement on certain improvements of, in, or applicable to the mule, Billy, Jenny, stretching frame, or any other machine or machines, however designated or named, used in spinning cotton, wool, or other fibrous substances; and in which either the spindles recede from and approach the rollers or other deliverers of the said fibrous substances, or in which such rollers and deliverers recede from and approach the spindles.—25th March.

— Andrew Smith, of Princes-street, Leicester-square, in the county of Middlesex, engineer, for an invention of certain improvements in apparatus for heating fluids and generating steam.—27th March.

— Wilton Wood, of Liverpool, in the county of Lancaster, merchant, for an invention of improved methods of making bands and tackling to be used in driving, turning, or carrying machinery.—27th March.

— John Ruthven and Morris West Ruthven, of Edinburgh, civil-engineers, for an invention of improvements in boilers for generating steam, in economizing fuel, in propelling vessels by steam or other power, and ventilating vessels; and which may be applied to mines or buildings.—28th March.

— John Gray, of Liverpool, in the county of Lancaster, engineer, for an invention of certain improvements in steam engines, and apparatus connected therewith, which improvements are particularly applicable to marine engines, for propelling boats or vessels; and part or parts of which improvements are also applicable to locomotive and stationary steam engines, and other purposes.—29th March.

— William Hale, of Greenwich, in the county of Kent, for an

invention of improvements in steam engines, and apparatus connected therewith, and in machinery for propelling vessels; part of which improvements are applicable to raising or forcing fluids.—2d April.

To William Henry Porter, of Russia-row, Milk-street, Cheapside, in the city of London, warehouseman, for an invention of improvements in anchors.—2d April.

— Thomas Adamson, of Dundee, in the county of Forfar, North Britain, ship-builder, for an invention of certain improvements in the machinery employed in turning windlasses.—2d April.

— Robert Logan, of Trafalgar-square, in the county of Middlesex, for an invention of a new cloth or cloths constructed from cocoa-nut fibre, and certain improvements in preparing such fibrous material for the same and other purposes.—3d April.

— John Bourne, of the city of Dublin, engineer, for an invention of improvements in steam engines, and in the construction of boilers, furnaces, and stoves.—16th April.

New Patents
SEALED IN ENGLAND.
1839.

To William Overton, of Shovel-alley, St. George's-in-the East, gentleman, for certain improvements in machinery or apparatus for making ships' bread or biscuits.—Sealed 3d April—6 months for inrolment.

To Thomas Edwards, of King-street, Holborn, writing and dressing-case manufacturer, for improvements in the manufacture of hinges.—Sealed 3d April—6 months for inrolment.

To Hugh Lee Pattinson, of Bensham, Durham, gentleman, and William Septimus Losh, of Walker, Northumberland, gentleman, for improvements in reducing metallic ores.—Sealed 3d April—6 months for inrolment.

To Josiah Marshall Heath, of Allen-terrace, Kensington,

gentleman, for certain improvements in the manufacture of iron and steel.—Sealed 5th April—6 months for inrolment.

To José Francisco Carlos d'Artenn, of the Haymarket, gentleman, for improvements in machinery for transmitting power, whereby the effect of such power is increased without loss of speed.—Sealed 5th April—6 months for inrolment.

To James Nasmyth, of Patricroft, near Manchester, engineer, for improvements applicable to the bearings or journals of locomotive and other steam engines, which improvements are also applicable to the bearings or journals of machinery in general.—Sealed 9th April—6 months for inrolment.

To George Stocker and Joseph Bentley, both of Birmingham, gun-makers, for certain improvements in guns, pistols, and other denomination of fire-arms.—Sealed 9th April—6 months for inrolment.

To Charles Adolphe Roederer, of Wellington-street, City-road, for an improved method or process of manufacturing or preparing the chemical salts called acetates.—Sealed 9th April—6 months for inrolment.

To Thomas Parkin, of New Bridge-street, Blackfriars, for improvements in railroad and other carriages, in wheels for such carriages, and in roads and ways on which they are to travel.—Sealed 9th April—6 months for inrolment.

To Thomas Bonsor Crompton, of Tarnworth, Lancaster, for improvements in the manufacture of paper.—Sealed 9th April—6 months for inrolment.

To Lemuel Wellman Wright, of Manchester, engineer, being an extension for seven years of former Letters Patent, for certain improvements on machinery or apparatus for washing, cleansing, or bleaching of linens, cottons, and other fabrics, goods, or fibrous substances.—Sealed 9th April.

To James Clement, of Liverpool, carver and gilder, for improvements in preparing mouldings, and in producing the effect of chasing or embossing various devices or pat-

terns on frames and other work.—Sealed 10th April—6 months for inrolment.

To Lot Faulkner, of Cheadle, Chester, calico-printer, for certain improvements in the mode of working pumps and valves, and which improvements are also applicable to fire-engines, and other similar apparatus.—Sealed 11th April—6 months for inrolment.

To Joseph Gillott, of Birmingham, steel pen-maker, and Thomas Walker, of the same place, machinist, for improvements in engines and in carriages to be worked by steam or other motive power.—Sealed 13th April—6 months for inrolment.

To Henry Crosley, of Hooper-square, London, civil-engineer, for a new manufacture of paper.—Sealed 15th April—2 months for inrolment.

To Lawrence Rowe, of Brentford, soap-maker, for improvements in the manufacture of sulphate of soda.—Sealed 16th April—6 months for inrolment.

To Henry Curzon, of the borough of Kidderminster, machinist, for improvements in presses.—Sealed 16th April—6 months for inrolment.

To Henry Dunnington, of Nottingham, lace-manufacturer, for improvements in machinery employed in making framework-knitting or stocking fabrics.—Sealed 16th April—6 months for inrolment.

To John Swindells, of Manchester, manufacturing chemist, for certain improvements in the manufacture of Prussian blue, prussiate of potash, and prussiate of soda.—Sealed 16th April 6 months for inrolment.

To James Fergusson Saunders, of New Bond-street, gentleman, for improvements in the manufacture of certain descriptions of paper, mill board, paper-maché, and other matters of that kind, capable of being produced from such description of paper pulp.—Sealed 20th April—6 months for inrolment.

To William Crofts, of Radford, Nottingham, lace-manufacturer, for improvements in machinery used in making bobbin-net lace, for the purpose of making figured or ornamented bobbin-net lace, and lace or net of various textures.—Sealed 20th April—6 months for inrolment.

To John Potter, of Ancoats, Manchester, spinner, and William Horsfall, of Manchester, card-maker, for an improvement or improvements in cards for carding various fibrous substances; part of which improvements may be used as a substitute for leather.—Sealed 20th April—6 months for inrolment.

To James Davis, of Walcot-place, Lambeth, Esq., for improvements in the manufacture of soap.—Sealed 23d April—6 months for inrolment.

To David Stead, of Great Winchester-street, London, merchant, for an improved mode or method of making or paving public streets and highways, and public and private roads, paths, courts, and bridges, with timber or wooden blocks.—Sealed 23d April—4 months for inrolment.

To Alfred Suiger, of Vauxhall, potter, and Henry Pether, of Wandsworth, artist, for certain improvements in the preparation and combination of earthenware or porcelain for the purpose of mosaic or tesselated work.—Sealed 23d April—6 months for inrolment.

To John Miller, of Bolton, in the county of Lancaster, machine-maker, for an improved drilling machine.—Sealed 23d April—6 months for inrolment.

To David Napier, of Millwall, engineer, for improvements in iron steam boats.—Sealed 23d April—6 months for inrolment.

To Elijah Galloway, of Water-lane, Tower-street, London, engineer, for improvements in steam engines.—Sealed 23d April—6 months for inrolment.

To Antonio Movillon, of Dorset-place, Dorset-square,

gentleman, for improvements in machinery for propelling ships' boats, and other vessels on water, designed to supersede the use of paddle-wheels.—Sealed 23d April—6 months for inrolment.

To George Holworthy Palmer, of Surrey-square, Old Kent-road, civil-engineer, for improvements in paddle-wheels, for propelling ships' boats, and other vessels navigated by steam or other motive power.—Sealed 23d April—6 months for inrolment.

To William Edmondson and James Edmondson, both of Manchester, engineers, for certain improvements in the machinery or apparatus for the manufacture of wood screws and screw bolts.—Sealed 23d April—6 months for inrolment.

To Job Cutler, of Lady Pool-lane, Aston Juxta, Birmingham, gentleman, for an improved method or methods of constructing chains for suspension bridges, cables, mining, and other purposes; and for an improved method or methods of making the bars, links, and bolts thereof.—Sealed 12th March—6 months for inrolment. This patent being opposed at the Great Seal Office, was not sealed till the 23d April, but bears date as above, per order of the Lord Chancellor.

To John James, of Westfield-place, Sheffield, for a new frying and grilling pan.—Sealed 25th April—6 months for inrolment.

To James, Barlow, of Birmingham, brass-founder, for certain improvements in the construction of candlesticks.—Sealed 25th April—6 months for inrolment.

To John Browne, of Castle-street, Regent-street, Esq., for improvements in saddles and stirrups for horses and other animals; parts of which improvements are applicable to apparatus for carrying packs by men.—Sealed 25th April—6 months for inrolment.

CELESTIAL PHENOMENA, FOR MAY, 1839.

D.	H.	M.	
1			Clock after the sun, 3m. 1s.
	—		☽ rises 11h. 8m. A.
	—		☽ passes mer. 1h. 34m. M.
	—		☽ sets 5h. 5m. M.
			Encke's Comet R. A. 22h. 21m. dec. 17. 3.
			Ditto passes mer. 19h. 43m.
3			Gambart's Comet R. A. 1h. 50m. dec. 17. 30.
			Ditto passes mer. 23h. 5m.
5			Clock after the sun, 3m. 28s.
	—		☽ rises 1h. 32m. M.
	—		☽ passes mer. 5h. 8m. M.
	—		☽ sets 8h. 52m. M.
			Encke's Comet R.A. 22h. 24m. dec. 16. 50.
			Ditto passes mer. 19h. 30m.
	10	15	♃'s first satt. will em.
6			♅ greatest hel. lat. S.
	3	43	☽ in □ or last quarter.
	11		♀ in Perihelion.
7			Gambart's Comet R. A. 2h. 3m. dec. 18. 8.
			Ditto passes mer. 23h. 2m.
8	8	27	♅ in conj. with the ☽ diff. of dec. 0. 4. S.
9	15	7	☿ stationary.
10			Clock after the sun, 3m. 49s.
	—		☽ rises 2h. 55m. M.
	—		☽ passes mer. 9h. 17m. M.
	—		☽ sets 3h. 59m. A.
			Encke's Comet R.A. 22h. 27m. dec. 16. 37.
			Ditto passes mer. 19h. 31m.
	17	6	☿ in Aphelion.
11			Gambart's Comet R. A. 2h. 16m. dec. 18. 55.
			Ditto passes mer. 22h. 59m.
	21		☽ in Perigee.
	14	14	☿ in conj. with the ☽ diff. of dec. 6. 20. S.
13	7	10	Ecliptic conj. or ● new moon.
15			Clock after the sun, 3m. 56s.
	—		☽ rises 5h. 2m. M.
	—		☽ passes mer. 2h. 11m. A.
	—		☽ sets 11h. 11m. A.
			Encke's Comet R. A. 22h. 29m. dec. 16. 28.
			Ditto passes mer. 18h. 56m.
			Gambart's Comet R. A. 2h. 29m. dec. 19. 40.
			Ditto passes mer. 22h. 57m.
	7	55	♀ in conj. with the ☽ diff. of dec. 3. 14. S.
17			Mercury R. A. 2h. 9m. dec. 9. 21. N.
	—		Venus R. A. 6h. 5m. dec. 25. 19. N.
	—		Mars R. A. 11h. 4m. dec. 7. 26. N.
	—		Vesta R. A. 7h. 32m. dec. 24. 36. N.
17			Juno R. A. 23h. 33m. dec. 1. 8. N.
	—		Pallas R. A. 12h. 48m. dec. 22. 36. N.
	—		Ceres R. A. 12h. 55m. dec. 7. 36. N.
	—		Jupiter R. A. 12h. 36m. dec. 2. 19. S.
	—		Saturn R. A. 16h. 26m. dec. 19. 42. S.
	—		Georg. R. A. 23h. 9m. dec. 6. 15. S.
	—		Mercury passes mer. 22h. 27m.
	—		Venus passes mer. 2h. 27m.
	—		Mars passes mer. 7h. 25m.
	—		Jupiter passes mer. 8h. 57m.
	—		Saturn passes mer. 12h. 45m.
19	10	17	♃'s second satt. will em.
20			Clock after the sun, 3m. 48s.
	—		☽ rises 11h. 20m. M.
	—		☽ passes mer. 6h. 38m. A.
	—		☽ sets 1h. 24m. M.
			Encke's Comet R. A. 22h. 31m. dec. 16. 22.
			Ditto passes mer. 18h. 38m.
	6	27	☽ in □ or first quarter.
21			Pallas stationary.
	4	31	♂ in conj. with the ☽ diff. of dec. 0. 44. N.
23			Gambart's Comet R. A. 2h. 58m. dec. 21. 3.
			Ditto passes mer. 22h. 55m.
	5	9	♃ in conj. with the ☽ diff. of dec. 3. 18. N.
24	9	24	♃'s third satt. will em.
	10		☽ in Apogee.
	11	56	♃'s third satt. will im.
	18	45	☿ greatest elong. 24. 47. W.
25			Clock after the sun, 3m. 28s.
	—		☽ rises 5h. 17m. A.
	—		☽ passes mer. 9h. 59m. A.
	—		☽ sets 2h. 17m. M.
			Encke's Comet R. A. 22h. 32m. dec. 16. 20.
			Ditto passes mer. 18h. 19m.
26	12	54	♃'s second satt. will em.
27			Gambart's Comet R. A. 3h. 14m. dec. 21. 39.
			Ditto passes mer. 22h. 54m.
28			Ceres stationary.
	2	5	♄ in conj. with the ☽ diff. of dec. 6. 56. N.
	10	27	♃'s first satt. will em.
	10	45	Ecliptic oppo. or ○ full moon.
	15	35	♄ in oppo. to the ☉.
	17	27	♀ greatest hel. lat. N.
30			Encke's Comet R. A. 22h. 32m. dec. 16. 22.
			Ditto passes mer. 18h. 0m.
31			Gambart's Comet R. A. 3h. 30m. dec. 22. 11.
			Ditto passes mer. 22h. 55m.
	3	30	☿ greatest hel. lat. S.

J. LEWTHWAITE, Rotherhithe.

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No. LXXXVII.

Recent Patents.

To JOSEPH HALEY, *of Manchester, in the county of Lancaster, machine-maker, for his invention of certain improvements in the machinery, tools, or apparatus for cutting, planeing, and turning metals and other substances.*—[Sealed 28th March, 1837.]

MY invention of certain improvements in the machinery, tools, or apparatus for cutting, planeing, and turning metals and other substances, consists, in the first place, in the arrangement and disposition of certain mechanism or apparatus calculated to perform the operation of cutting up, trimming, or squaring the sides of nuts and bolt heads, in order to give them a bright, square, and accurate finish; and also, that all the sides of each nut or bolt heads shall be of equal dimensions and exact correspondence to each other, whether their forms be hexagonal, octagonal, or of any other polygonal figure.

This improved cutting engine is so constructed as to be self-acting; that is, requiring no other operator or attendant than a boy to supply the rough nuts or bolts to the machine as they leave the forge, and remove them when the heads are squared or finished. Secondly, my improvements in planeing metals consist, in a new and improved arrangement of those parts called the motions of the ordinary planeing machine, which govern or regulate the horizontal movements or traversing of the tool carrier along the cross slide when the cutting tool is planeing a straight or flat surface, or in lifting the cutting tool from its work after the whole length of the cut has been performed, and when it is necessary to reverse the motion of the table in order to take the successive parallel cuts as the tool traverses across the machine; also, in a new method of performing the vertical motion of the tool carrier when planeing a perpendicular, bevilled, or any angular surfaces, or performing a downward cut; and the arrangements of these improved motions (as will be hereafter described) enable me to dispense entirely with the inconvenient arrangement of the pulleys and bands which are employed for the above purpose in many of the ordinary planeing machines. Thirdly, my improvement in turning metals consists in a peculiar contrivance for throwing the back shaft of the headstock of the ordinary geared lathe in and out of gear at pleasure, by the adaptation of excentric bushes or bearings, thereby dispensing with the various pieces and fittings usually applied to lathes for the purpose of communicating a slow motion to the running parts of the headstock.

In order that my improvements may be more particularly explained, I have attached several figures, representing different views of the various machines I have referred to.

Fig. 1, Plate VII., represents a front elevation of my

improved cutting engine for squaring nuts, bolt heads, &c.; fig. 2, a side or end elevation of the same, taken at the left hand of fig. 1; fig. 3, is a vertical section, taken longitudinally about the middle of the machine; fig. 4, is a horizontal view as seen from above; and fig. 5, is a representation of the underside of the machine, it being supposed to be turned bottom upwards in order to show the working parts (which are situated underneath the headstock) more distinctly.

The upright standards or framing of the machine *a*, *a*, support a bed *b*, *b*, which carries the headstock *c*, *c*; this bed *b*, *b*, is provided with bevilled slides or angular V edges *d*, *d*, in order to allow the headstock to slide longitudinally backwards and forwards as may be required; the headstock *c*, *c*, is also partially supported by an intermediate plate of metal or bed *e*, *e*, which is likewise provided with bevilled sliding or V edges *f*, *f*, to admit of the headstock, with the gearing, traversing across the machine, horizontally and at right angles, to the former slide *d*, *d*. A shaft *g*, *g*, which receives the driving power from the pulley *h*, is mounted in the headstock *c*, *c*, and carries the pinion *i*, which being in gear with the toothed wheel *j*, communicates rotary motion to the shaft *k*, *k*. About the middle of this shaft *k*, there is a pulley *m*, which may receive the driving power direct from the line of shafting in cases where the tool is not required to be particularly steady and true in its cut, the pinion *i*, being first put out of gear. An upright spindle or arbor *n*, *n*, which is surrounded by a cylindrical guide or bearing *o*, *o*, is mounted in the socket or support *p*, which is secured, in its proper position, on to the bed *b*, *b*, of the machine.

These parts will be more readily understood by reference to fig. 6, which are detached, and sectional views of the arbor or spindle *n*, *n*, and the parts in immediate connexion

therewith. The nut which is intended to be trimmed or squared in the machine is screwed upon the upper end of the spindle or arbor *n*, as shown at *q*, *q*; and the bolts are to be screwed into an arbor or spindle formed with a socket, as at *n'*, *n'*.

In order to put the machine in operation, the attendant turns the balance wheel *r*, which is fixed upon the horizontal screwed shaft *s*, underneath the bed of the machine (see the reversed view, fig. 5). This screw shaft *s*, works in the nut *t*, which is made fast to the headstock *c*, *c*, carrying the gearing and the cutting tool, therefore the headstock is made to advance upon the sliding edges of the bed *b*, *b*, and consequently to present the rotary cutter to the nut when it is in a proper position to commence facing or trimming up that side of the nut which is parallel to the side or face of the cutting tool; see figs. 1, 2, and 4. Now, as the headstock has advanced longitudinally towards the nut to be squared, a rectangular horizontal motion of the headstock carrying the cutter is required, in order to traverse the cutting tool across the bed *b*, and advance the cutter gradually along the side of the nut until the whole of its surface has been trimmed or faced up. The requisite motion is obtained by means of the pinion *u*, which is fixed upon the outer end of the shaft *k*, *k*, taking into the wheel *v*, upon the stud or pin *w*. Upon this stud another pinion *x*, is also fixed, which gears with the toothed wheel *y*, upon the end of the horizontal shaft *z*, supported in bearing in the bed of the machine (see the underside view, fig. 5). On the shaft *z*, a conical tappet or cam roller 1, is mounted fast, revolving with it; and a bolt or pin 2, which passes through a mortice in the bottom of the headstock, and carries a square piece of metal 3, upon which the surface of the conical tappet 1, acts, as it revolves in contact with it.

It will now be seen, that as the bolt or pin 2, is made

fast to the headstock *c*, by tightening the nut at its upper end, the conical surface of the tappet or cam roller 1, acting against the block or tail piece at the end of the pin 2, will thus drive the bolt, and with it the headstock (carrying the cutter), horizontally across the machine, and necessarily advance the cutter upon the nut or bolt head under operation.

Four different views of this conical tappet or cam roller detached are shown at fig. 7. It will be found that when this tappet has completed an entire revolution, the cutting tool has also completed surfacing one side of the nut under operation, and the pin 2, with its tail piece 3, immediately escapes the conical surface, and slides along the step or fall which is formed in the cone; and the spring 4, acting against the stud 5, fixed into the bottom of the headstock, forces the headstock back into its former position, when it is ready to make a similar advance across the machine, and trim up or square the remaining sides of the nut or bolt head, as they are successively presented to the face of the cutting tool.

As it will be found necessary to increase the distance or length of the traverse of the headstock and cutting tool across the machine in the event of a larger nut or bolt head being placed under operation, this is effected by loosening the nut from the top of the pin 2, and sliding it in the mortice cut in the bottom of the headstock, which is done by turning the small screwed shaft 6, (see fig. 1,) running through the pin 2, and bearing against the end of the mortice for this purpose. I thus increase or diminish the length of the stroke by sliding the tail piece of metal 3, along the varied surface of the conical tappet 1, and thereby obtain a greater or less driving surface as may be required; and to accommodate this sliding upon the surface of the one, the tail piece 3, is allowed to turn freely upon the

pin 2. At the time that the tail piece 3, escapes from the surface of the conical tappet 1, and the cutter returns to make a second movement across the machine, the position of the nut or bolt head under operation must be changed, in order to present a fresh rough side to the cutter; this is effected in the following manner:—Upon the horizontal shaft *z*, there is also another tappet or cam 7; this cam is cylindrical as to its periphery, but has one side or edge formed as a helical inclined plane, or single turn of a worm or screw, which will be best seen in figs. 3, and 5; and as it revolves with the shaft *z*, its curved edge bears against the tail or end of a moveable bar 8, which slides in bearings formed in the bed *b*, *b*. To this bar a small rack of spur teeth 9, is attached, which takes into a corresponding toothed quadrant 10; and this quadrant runs loosely round the cylindrical guide *o*, *o*: with this toothed quadrant is also cast a tail or projecting piece, which carries the pall or click 11. Now, when the tappet roller 7, has made an entire revolution, the bar 8, will have slidden outwards, and the quadrant 10, and with it the click 11, will have arrived at the position shown by dots in fig. 5; the spring 12, acting against the stud or projecting piece 13, fixed on to the bar, will force the bar again inward as it escapes the end of the inclined plane, and resumes its former position, as seen in fig. 3. This return of the bar (which takes place at the same instant that the cutting tool *l*, has finished one side of the nut) causes the click 11, to drive the ratchet wheel 14, round, and with it the cylindrical socket *o*, to which it is firmly attached; and the spindle or arbor *n*, carrying the nut or bolt head under operation, also receives the rotary motion imparted to its carrier or socket *o*, *o*, and thus presents another side of the nut to the action of the cutting tool *l*.

It will be seen by reference to figs. 1, and 4, that there

is a dividing plate 15, also attached to the spindle or arbor *n*, and its socket or carrier *o*, *o*: this plate 15, must be equally divided into as many parts as there are sides upon the nut or bolt heads intended to be squared, and having notches cut in its periphery, corresponding with the number of sides of the nut or bolt head, the one shown in the drawing being hexagonal. Now, in order to release the catch lever 16, (which retains the plate, and with it the arbor *n*, in its proper position while the nut is being trimmed or squared,) there is a small hook or stock piece 17, which is moveable on a pin placed in the back of the sliding bar 8; and as the bar 8, is projected by the rotation of the tappet roller 7, the hook 17, rises over and catches hold of the tail of the small lever 18, which being fixed at the reverse end of the same pin or shaft that carries the catch lever 16, it will be removed from the notch in the divided plate 15, and allow it to be turned partially round until the catch lever falls into the next notch or division, and retains the plate, and with it the nut, in a proper position for the action of the cutting tool. The piece forming the small rack of teeth 9, is allowed to slide loosely a short space by its adjusting screws running in mortices cut in the bar 8, (see fig. 3,) in order that the catch lever 16, may be released from the dividing plate prior to the revolution; that is, that this motion of releasing the sliding plate may slightly overrun the motion for turning the plate, although both are gained from the same source, namely, the tappet or cam roller 7, and sliding bar 8.

When it is required to place a nut or bolt head in the machine to be squared, varying in dimensions from any that have already been operated upon, a different spindle or arbor *n*, will be required, with its screwed end or socket corresponding to the diameter of the nut or bolt head about to be worked; the spindle *n*, therefore, which is in the

machine, must be removed by turning the swivel handle 19, which will unscrew the nut and release the spindle from its bearings, thus allowing it to be drawn out of its socket altogether, that another may be introduced.

It will be very obvious to a practical mechanic, that a slight modification of this machine will render it equally applicable to cutting teeth in the peripheries of wheels and any other similar process. A small mandril may also be introduced into the socket on the end of the shaft *k*, instead of the cutting tool, and upon this mandril the tops and bottoms of nuts and bolt heads may be faced up as in an ordinary lathe.

My second improvement is in the planeing machine, and consists principally of a new arrangement of those parts or mechanism immediately in connexion with the "cross slide" of the machine upon which the tool carriage performs its horizontal traverse across the machine while planeing a flat or horizontal surface; also, in an improved arrangement of those parts of the mechanism which operates upon the tool slide in the carriage, in order to perform the vertical motion of the cutting tool while planeing either a perpendicular or any bevilled or angular surface; and also, in a new arrangement of mechanism for lifting the tool from the surface of the work after the completion of every cut.

These improvements will be better understood by reference to sheet 2, in which fig. 8, is a front elevation of that portion of a planeing machine which represents the headstocks, cross slide, and tool carriage, with the bed of the machine shown in section; and fig. 9, is a partial plan or horizontal view of the machine, with the driving gear attached: *a, a,* is the ordinary bed of the planeing machine, supporting the table *b, b,* upon which the work intended to be planed is secured; *c, c,* are the headstocks

or upright standards which support or carry the cross slide *d, d*; and *e, e, e, e,* represents the ordinary system of screwed shafts and gearing, intended for the purpose of raising or lowering the cross slide *d, d,* and with it the tool carriage, as the dimensions of the work to be planed may require.

The driving power is communicated to this machine by a strap passing from a drum upon the common line shafting, and round the pulley *f*. This pulley runs loosely upon its shaft *g*, and its pinion takes into a wheel *h*, keyed upon the shaft *i*, which also carries a pinion *j*, upon its other end, gearing with the wheel *k*, upon the shaft *l*, driving that shaft, and with it the chain pulley *m*; consequently the chain which is passed round this pulley *m*, being also attached to the table *b, b*, the table is drawn along the bed of the machine, and the tool will now perform its cut in the usual manner.

It is to be understood that stops are to be applied to the sides of the table; which stops or projections run against the adjustible stop pieces *n*, upon the longitudinal rod or bar *o, o*, so that when the whole length of the cut has been made, the strap lever *p, p*, being connected by a joint to the bar *o*, and having its fulcrum at *q*, will be vibrated, and, consequently, shift the strap from the pulley *f*, to the pulley *r*. This pulley *r*, is keyed fast upon the shaft *q*, and drives the pinion *s*, which gearing with the wheel *t*, by means of the intermediate or carrier wheel *u*, drives the pinion *j*, upon the shaft *i*; and thus the wheel *k*, and chain pulley *m*, are driven the reverse way in order to return the table, and bring the work back ready to receive another cut; and owing to the difference of the speeds which are shown in the wheels *h*, and *t*, the return of the table is made twice as fast as the advance of the same, in order that as little time as possible may be lost when the tool is

not in action. Previously to the return of the table, the cutting tool, which is shown at *v*, has to be canted or pushed a slight degree obliquely, in order that its cutting edge shall not touch the work as the table returns, which is effected as follows:—There is a hollow cylindrical shaft or tube *w*, *w*, extending along the whole length of the cross slide, and nearly surrounding the screwed shaft *x*, *x*, which gives the horizontal traverse to the tool carriage. This hollow shaft or tube *w*, *w*, is connected by a boss *x*, to a short lever *y*. At the end of this lever *y*, there is a pin and socket connecting it to the perpendicular rod or connecting link *z*. The lower end of this rod *z*, is also connected, by a similar lever, to the horizontal shaft 1, 1, passing across the bed of the machine, and by means of a small upright lever at its other end, it is connected to the longitudinal rod or bar *o*, *o*; which rod, as it is slidden along by the stops upon the table, after every cut has been performed, also vibrates the short levers at each end of the shaft 1, 1; and by means of the rod *z*, and lever *y*, the hollow shaft or tube *w*, is turned partly round.

Upon a sliding boss on this hollow shaft *w*, immediately behind the cutting tool *v*, is a small cam or inclined plane 2, (see the sectional plan and side views of the tool carriage and cross slide,) figs. 10, and 11, which, as the tube *w*, revolves, projects the pin 3, against the small tail piece 4, sliding upon the square upright shaft 5. At the bottom of this square shaft 5, there is a similar tail piece 6, which will project the small pin 7, as the square shaft 5, is moved partly round by the action of the pin 3. The pin 7, presses against the tail of the spring 8, and thus pushes the tool a little out of the perpendicular, as shown by dots in fig. 11, and prevents it touching the work that has been planed; and as the table returns to the succeeding cut, the tool will be brought to its upright or cutting position by the

stops on the table moving the longitudinal bar *o*, the reverse way: thus relieving the tail of the spring 8, from pressure, when its other end will cause the tool to resume its former position.

Now, as the table *b*, *b*, has arrived at the end of its journey, and the whole length of the cut has been performed, immediately after the tool has been lifted from the work under operation, the horizontal traverse of the tool carriage has to be made upon the cross slide, in order to bring the tool into a position capable of taking another cut parallel to the one which has just been made. This is done by means of a small pin or stud 9, also fixed in the lever *y*; which pin 9, by acting against two projecting pieces 10, 10, placed at the back of the box 11, causes the box to revolve, and with it the catch or click 12; and the catch 12, being in gear with the ratchet wheel 13, in the box, and keyed fast upon the screw *x*, rotary motion is thus given to the screw working in the nut 14, attached to the tool carriage, which will traverse the carriage as required.

It will be seen, by reference to the auxiliary fig. 12, that there is a mortice cut in the box 11; this is for the purpose of adjusting the distance of the stop pieces 10, 10, and thus regulating the length of the traverse or breadth of the cut, by allowing the box to revolve more or less, and causing the click to take a greater or less number of teeth of the ratchet wheel upon the end of the screwed shaft *x*.

There is a small projecting handle upon the catch or click 12, for the purpose of putting either end of the catch into gear with the ratchet wheel, and which being held by a back spring, thus causes the screwed shaft *x*, to traverse the tool carriage either to the right or to the left. When it is required to make a downward cut, as in those cases where the tool has to plane a perpendicular or angular

surface, the tool slide has to receive a vertical motion, which is given in the following manner, the small handle 15, (see the tool carriage in fig. 8,) first being pressed downwards, will put all the parts in gear that are connected with this motion. Supposing the two moveable stops 10, 10, in the box 11, are fixed as shown at their fullest extent, the pin upon the lever *g*, will then have no power over them, and the screw *x*, will be immovable; but the action of that lever will continue to effect the tube or hollow shaft *w*, after the end of every cut, as before described. Upon the sliding boss of the tube *w*, there is also a bevilled toothed segment 16, working into an intermediate double bevil wheel 17, communicating motion to the pinion 18, which is loose upon the lower end of the vertical screw 19; but the action of the small handle 15, having first locked this pinion 18, to the vertical screw by means of the catch box 20, it is now thrown into gear. The vertical screw shaft 19, being now in absolute connexion with the travelling table, the tool carriage will be brought down in its slide after the completion of every cut by means of this vertical screw working into the nut 21, at the upper part of the tool slide.

My third improvement is in the lathe for turning, and consists in the application of excentric brasses or steps acting as bearings for the back shaft, and forming a ready and expeditious mode of throwing it in and out of gear as may be required, in order to obtain or dispense with the slow motion of the lathe. This will be better understood by reference to fig. 13, which is a front elevation of the ordinary fast headstock of a lathe, and is represented partly in section at fig. 14, an end elevation of the headstock, and fig. 15, a vertical section taken across the middle of the same: *a*, *a*, is the headstock, which supports the

mandril *b*, carrying the speed pulleys *c*, *c*; *d*, is a bracket bolted on to the headstock, and carrying the back shaft *e*: this back shaft runs in bearings or brasses *f*, *f*; and these brasses are made excentric, as shown at the auxiliary fig. 15.

It will be seen that the back shaft of the lathe *e*, *e*, is made hollow, in order to admit of a square shaft *g*, *g*, being passed through it; and this shaft *g*, also passing through holes in the flanges or ends of the brasses, couples them or keeps them square to each other, preventing one being turned round without the other. A small handle *h*, is put upon one end of the square shaft; and it will be seen that when this handle is turned either backwards or forwards half a revolution, the brasses in which the back shaft *e*, *e*, bears being excentric, that shaft, with its wheel and pinion, will be thrown out of gear with those upon the mandril of the lathe. Fig. 14, represents the gearing of the back shaft out of gear, and fig. 15, shows the same in gear, with that upon the mandril.

Having now described the particular features of my improvements, and the mode of carrying the same into practical operation, I desire it to be understood that I do not intend to claim any of the well-known parts of any of the machines I have above referred to, nor to confine myself to any of the sizes or dimensions of any ot the new parts or mechanism I have described; but I claim as my invention, firstly, the improved construction and arrangement of mechanism and apparatus for trimming, squaring, shaping, or finishing the sides of nuts or bolt heads, or for any other purpose for which such machine may be employed, as I have above described and shown in the drawings annexed; secondly, the improved mechanism or motions shown and described with reference to the planeing machine; and thirdly, the mode above

described of mounting the back shaft of a lathe in order to throw the slow motion in and out of gear.—[*Inrolled in the Rolls Chapel Office, September,* 1837.]

Specification drawn by Messrs. Newton and Berry.

To WILLIAM DOLIER, *of Liverpool, in the county of Lancaster, lecturer on education, for his invention of a certain durable surface or tablet for the purposes of receiving writings, drawings, or impressions of engravings or other devices capable of being printed, which surfaces may be applied for roads or pavements, and parts of which invention may also be used as the means of strengthening and beautifying glass.*—[Sealed 30th August, 1838.]

MY invention of a certain durable surface or tablet, for the purpose of receiving writings, drawings, or impressions of engravings or other devices capable of being printed, consists, firstly, in the application of a well-known composition or material as a durable tablet or surface for receiving writings or drawings, and which may be removed at pleasure by moisture. This composition or material is common glass enamel, made in the ordinary manner from flint glass, borax, and arsenic, and which I roll out in thin plates of any required dimensions, exactly similar to manufacturing plate glass; and after it has been ground smooth and polished, I remove the glazed surface by grinding with the finest emery powder, and then the tablet is ready for use. This permanent tablet will now be found capable of receiving the finest writing or drawing, and also beautifully adapted to receive paintings and impressions, ex-

actly in the same manner as ornamenting china by painting or transfer.

This improved tablet will be an elegant appendage to various domestic purposes and furniture, and may be manufactured into sideboards, billiard tables, table tops, and all other similar ornamental purposes; and may have either a highly polished or dead surface, and may be composed of any variety of colours by altering the ingredients of the enamel, which is well understood.

My second improvement in a durable surface, is in rendering the same perfectly pliable, and still rendering such surface durable. This is composed by a foundation of a sheet of linen, silk, cotton, or other cloth, linen being most preferable, to be coated or covered upon one side with a mixture or composition, and treated as follows:—Spread upon the reverse side of the sheet of linen one coat of a size or varnish, made by dissolving one pound of buffalo skin in one gallon of water over a slow fire, and let the other side, when dry, be rubbed with pumice stone, in order to remove all inequalities, and leave the surface perfectly smooth. This surface is now to be coated three times with a mixture of the purest white lead, called flake white, with boiled linseed oil and spirits of turpentine, in about the proportions of one pound of white lead to one quart of oil and half a pint of turpentine. After this has become perfectly dried, the flexible surface is ready for use, and is most suitable for printing, and particularly advantageous for receiving impressions of maps or charts for marine and general purposes, as being permanent and durable. The back or reverse side of this prepared cloth may be flocked with pulverized woollen cloth in the usual manner of flocking paper hangings, which will improve its appearance, and make it more suitable for ornamental purposes. Gold, silver, or bronze surfaces may also be

given to the cloth thus prepared, by giving it a coat of the buffalo size, and dusting the metallic powder over it.

Thirdly, these improvements are applicable to roads and pavements for bath-rooms and other similar situations, or tessellated pavements, where damp or wet is liable to get between the joints of the pavements, and form unhealthy and improper secretions; and consist in putting together squares of such enamelled surfaces as first above described, or common bath tiles in squares in different colours and devices, and cement or cover the joints with a light coating of glass enamel fused over the joints in order to render them perfectly secure; and in all situations where cleanliness and beauty are required, this will be found particularly useful.

A further application of this invention may be made by having engraved or printed maps or other designs made upon the under side of plates of glass, and vitrifying the glass to render the design permanent, and paving rooms with such plates or squares for the purposes of recreation; and also by inserting rails of glass, either in bars, rods, or plates, set edgewise in grooves or sleepers of wood or metal, making such rails either portable or permanent, and also intended as applicable to various amusements which may thus be pursued in gardens or other situations.

The fourth feature in my invention relates to the strengthening and beautifying glass, and consists in preparing sheets or plates of glass in the usual manner, and placing between two plates a metallic web of wire, wrought into any form or design that may be desired, and then partially fusing the glass so that the glass shall run between the meshes or interstices of the metallic design, and thus consolidate or embody the whole into one plate of glass, with the metallic design in the centre.

The metallic web or design may be formed of either

plain net, or any other elegant scroll work or other design, and be composed of brass plated, or other metallic wire, and cast into any form or device which shall be required, and the glass fused around it, and rolled or pressed in the ordinary manner of manufacturing plate glass.

Another adaptation of these improvements is particularly applicable to ornamental windows and casements, where the glass is not required to surround the metal upon all sides. A suitable casting is to be prepared in brass, iron, or other metal, of the exact form of the window frame required; for instance, an ornamental Gothic window, and this casting is to be the framework of the window. The glass is then to be cast in its fluid state into the metallic framing, and may either be rolled of such a thickness that the metal frame shall be in the centre of the plate of glass, or it may be rolled down until the glass shall only fill the interstices of the metallic framing; and thus in either case, the whole of the panes or compartments, an ornamental window may be made in an entire piece, and of any variety of form, strength, or beauty. The glass is afterwards to be annealed in the usual manner, and then submitted to a bath of cold linseed oil, which is to be caused gradually to boil, and after removing the fire allowed to cool, which will thus form a second annealing, and also regulate the expansion and contraction of the metals. The glass is to be ground up and polished in the usual manner, and may either be made bright for windows, or rendered opaque to be employed for all useful and ornamental purposes of furniture, to be used instead of the finest marbles, and with equal beauty and effect.

This combination of metals with glass, for the purposes of increasing its strength, will be of material importance for "dead lights" for all marine purposes, and also forming perpetual window blinds; and it will be evident that great

strength may thus be given to glass for windows and such similar purposes by either of the processes above described. —[*Inrolled in the Rolls Chapel Office, February,* 1839.]

Specification drawn by Messrs. Newton and Berry.

To James Kean, *of Johnstone, in the county of Renfrew, in the kingdom of Scotland, machine-maker and engineer, for his invention of an improved throstle flyer, or a substitute for an ordinary flyer, employed in spinning cotton. flax, hemp, wool, silk, and other fibrous substances.*— [Sealed 3d July, 1835.]

This invention is a new construction of flyer to which the atmosphere will not offer such a resistanee as to the ordinary flyer with arms; the Patentee, therefore, concludes that he will be able to make his flyer revolve at a greater velocity than the ordinary flyers, or he will be able to make a larger number of flyers revolve at an equal velocity with a given power, by that means economizing power and time.

The improved flyer consists of a cylinder with a smooth, highly-polished, and unvarying surface, to which the atmosphere will offer little or no resistance. Plate VIII., fig. 12, represents a section of a spindle with the improved parts attached; *a,* being the cylindrical flyer, and *b,* the bobbin. The Patentee says, that he does not mean to confine himself to any particular material of which the flyer may be made nor does he confine himself to cylinders alone, as it must be evident that conical flyers may be advantageously used but he prefers the cylindrical one.—[*Inrolled in the Inrolment Office, January,* 1836.]

To JEAN JAQUES LEOPOLD OBERLIN, *of Leicester-square, in the county of Middlesex, merchant, for improvements on, or additions to, boilers, applicable to various purposes, being a communication from a foreigner residing abroad.*—[Sealed 18th January, 1834.]

THIS invention relates to that description of boiler which is used for the purpose of boiling water for culinary and domestic uses, the object of the invention being a method of always keeping the water at one temperature. This is effected by a regulator that is acted upon by the ebullition of water in boiling, and which cuts off the draft in the flue until such time as the ebullition ceases, when it returns to its original position.

It should be observed that any fluid may be employed for the purpose of acting on the regulator, and thereby arresting the progressive increase in the temperature of the water. For instance, it may be considered desirable to keep the water at a temperature much below the boiling point; some fluid, therefore, must be used that will boil at a much lower temperature than water; or if it be desired to keep the water boiling, some fluid must be used that does not boil at so low a temperature. In all these cases the apparatus will be slightly different.

One description of apparatus for effecting this is a sort of pulse glass, which also indicates upon a scale the height of water in the boiler.

The Patentee says, at the conclusion of the specification, that he does not claim the principle of applying the ebullition of the water to regulating the temperature, as that has been done before; but he claims only the apparatus described for carrying this principle into effect.—[*Inrolled in the Inrolment Office, July,* 1834.]

To Robert Gillespie, *of Piccadilly, in the county of Middlesex, merchant, for certain improvements on trusses or instruments for the cure of hernia or rupture.*— [Sealed 3d April, 1835.]

This improved instrument consists of a strong curved and elastic spring, terminating at one end in a neck that deviates slightly from the general course of the spring, and which ends in a broad expansion that has holes made through it; and rising from the outer surface of this expansion, is a hook or button. From the extremity of the spring at the neck to its opposite extremity, its breadth slightly lessens, and has a covering of strong thin leather, being also lined and padded on its concave surface, to prevent abrasion of the skin.

To the end of this covering, a strong leather strap is attached, having holes near one of its extremities; and accompanying the instrument is a strip of leather which is called a thigh strap.

On the expanded neck of the spring, a block of poplar wood is attached by screws to its plane surface. This block of wood must have one plane surface of a triangular shape, and tapering to an obtuse irregular cone, polished smooth, and in some instances having a groove in one side for the reception of the spermatic cord.

That part of the instrument which is claimed to be new, is stated by the Patentee to be the wooden pad-block or rupture head above mentioned, as it differs from all others heretofore in use, in its shape, economy, and firmness, and by which all the force of the spring is concentrated in a small compass. The instrument may, of course, be varied in size, so as to suit every subject; and the blocks or rupture heads may be constructed more or less obtuse, according to circumstances, and the age and constitution of

the person. The spring should also be made weaker or stronger, as the system of the subject is the more excitable or the reverse; but it is intended that the spring should be sufficiently strong to create inflammation, which is quite contrary to the object of ordinary trusses.

The Patentee proceeds to describe the method of applying the instrument. He says, the rupture head should be placed with its point immediately in the opening through which the abdominal contents have protruded, the point avoiding pressure looking backwards and pointing slightly upwards, the spermatic cord being free from pressure by its being received into the groove formed in the edge of the rupture head.

The body of the spring passing round and closely embracing two-thirds of the pelvis, is held firmly on by the leather strap that is attached to the end of the covering which inserts the spring; the circles round the pelvis being thus completed by the leather strap, it is fastened to the button or hook in front.

The strip of leather or thigh strap is confined around the spring, and its covering near the anterior superior spinous process of the illium, and passing on the back of the thigh returns in front, and is fastened near the same place. By this means a displacement upwards is prevented, and the instrument is held down in its proper situation.

It may be as well, also, to observe, that when the parts about the abdominal rings have become sore from the pressure of the spring, it would be advisable to place a piece of soft linen between the rupture head and the skin; and if the skin should become irritated by the pressure of the rupture head, the irritated part should be bathed in cold water, or a solution of some slight astringement, such as alum and water.—[*Inrolled in the Inrolment Office, October,* 1835.]

To Richard Freen Martin, *of Hercules-buildings, Lambeth, in the county of Surrey, gentleman, for his invention of a certain process or processes, method or methods, of combining various materials so as to form stuccoes, plasters, or cements, and for the manufacture of artificial stones, marbles, and other like substances used in buildings, decorations, or similar purposes.*—[Sealed 8th October, 1834.]

This invention consists in combining gypsum or plaster of Paris, lime or chalk, or similar substances with other materials hereafter described, and submitting them when so combined and moulded to the action of heat, for the purpose of calcining them, when it will be found that the combination so treated will produce a very fine hard artificial stone. The manner of proceeding is as follows:—Take any quantity of gypsum, such as is used in the manufacture of plaster of Paris, or a quantity of old moulds or casts made of plaster of Paris, and reduce them by crushing or grinding to a fine powder. This being done, the following mixture must be made:—dissolve a quantity of strong alkali, say American pearlash, in a gallon of water; then neutralize the alkali by adding from time to time small quantities of sulphuric acid, until the effervescence ceases; then add to this, seven gallons of water, making in the whole eight gallons. The pounded gypsum or other material is then to be added to the solution, until it arrives at the proper consistency for moulding or casting. The bricks, blocks, or other articles made of these ingredients are then to be submitted to a red heat in a furnace or retort, such as is used in gas-works; and after being heated through to redness, they will be found to have become very hard, and will answer the purposes of artificial stone.

The Patentee says, in conclusion, that although he has

mentioned pearlash as the alkali, and sulphuric acid as the acid to be used in his process of making artificial stone, yet he does not intend to confine himself to the use of these ingredients alone, as others will answer this purpose; but he prefers them, as he has found these materials to answer the purpose better than any other that he has tried. [*Inrolled in the Inrolment Office, April,* 1835.]

To BENNET WOODCROFT, *of Mumps, in the township of Oldham, in the county of Lancaster, gentleman, for his invention of improvements in the construction of looms for weaving various sorts of cloths; which looms may be set in motion by any adequate power.*—[Sealed 4th January, 1838.]

THIS is a loom intended to work with a Jacquart apparatus, and to be driven by steam or other rotary power. The first and principal feature of novelty proposed, is in the construction of the tappet wheel, by which the treadles are raised and depressed that open the sheds of the warp. The tappet wheel is formed by any suitable number of segment pieces of iron, in the faces of which segment pieces indented grooves are cast, for the purpose, when combined, of producing a zigzag groove round the face of the wheel, to suit any required pattern to be woven in the cloth. In this zigzag groove a roller works, attached to an upright rod, which is connected to the levers or treadles; and hence, as the tappet wheel revolves, the treadles are worked up and down, according to the elevations and depressions formed in the wheel, and the portions of the warp raised and depressed accordingly.

The segment pieces are all made to correspond and to fit together in the wheel, so that they may be readily

changed, and a different zigzag groove produced in the tappet wheel when required, according to the sort of cloth desired to be woven, thereby superseding the necessity of casting many wheels with different shaped grooves, and of shifting the wheels where any variation in the weaving is required. The claim of invention and novelty consists in this mode of producing tappet wheels.

Subordinate to this contrivance are certain mechanical arrangements of the loom, viz., the rod which holds the roller that works in the tappet is connected above to the two outer jacks of an ordinary power loom, and acts upon vertical rack bars that take into a pinion which raises and depresses the portions of the warp equally, and thereby prevents any under strain. There are certain vibrating bars connected with the jacks and with the needles, which are thrown from side to side by the action of the tappet rod on the racks and pinion; and these bars have notches in their edges, which are taken hold of by horizontal bars connected to the treadles, for the purpose of moving or holding back certain of the needles agreeable to the command of the tappet wheel.

The rising of the tappet rod and the rack bar works a crank that turns over the Jacquart frame, and brings the successive pierced cards into operation on the ends of the needles, and a spring is introduced to ease the action of the card frame.

There are, in the accompanying sheets of drawings, various detached figures of parts of the loom, but no one showing its general construction and action. But the principal feature, and that on which the whole depends, is the tappet wheel formed by moveable segments, as above stated.—[*Inrolled in the Inrolment Office, July,* 1838.]

To John Samuel Dawes, *of Birmingham, in the county of Warwick, iron-master, for his invention of improvements in the manufacture of iron by the application of certain known materials; and for improvements in preparing such materials, and for the recovery of certain products in the process of manufacturing iron.*—[Sealed 9th December, 1835.]

This invention consists in applying a blast of pure hydrogen (which is to be obtained from the decomposition of water), in combination with atmospheric air. The hydrogen and atmospheric air may be introduced into the furnace either in a mixed state or by two separate twyers. The hydrogen gas may be obtained by passing water in the state of vapour through iron pipes heated to a red heat, which will take up the oxygen, and allow the hydrogen to pass off through water; after which it is collected in receivers in the ordinary manner.

The Patentee states, that he has found that cyanogen is collected in considerable quantities in the furnace; he, therefore, introduces a tube or pipe and draws it off, and by this means obtains an article which is highly useful in the arts, but which has an injurious effect in the making of iron.—[*Inrolled in the Inrolment Office, June,* 1836.]

To Joseph Henri Jerome Poittevin, *of Craven-street, in the county of Middlesex, gentleman, for a powder which is applicable to the purposes of night soil and certain other matters, and facilitating the production of manure, being a communication from a foreigner residing abroad.*—[Sealed 17th July, 1835.]

The powder mentioned is produced by calcining in a suitable vessel mud obtained from rivers or ponds, or any

other mud will answer the purpose if it contains animal and vegetable carbon, and is capable of being carbonized when subjected to the process of calcination in an iron vessel heated to redness by an ordinary furnace.

The mud should be obtained in as dry a state as possible, as that will materially assist the calcining process, and render it much less difficult and troublesome.

The calcination being complete, flames will be seen ssuing from the vessel, when the product must then be taken out and subjected to pulverisation, and the powder produced will be the powder referred to in the title of the patent. When the powder is mixed with night soil, a strong odour will be given out, but the mixture will soon become disinfected; and if it be considered that the mud does not contain sufficient carbon, then about ten per cent. may be added.—[*Inrolled in the Inrolment Office, January,*1836.]

To JAMES LEE HANNAH, *of Brighton, in the county of Sussex, Doctor of Medicine, for his invention of a certain improvement or certain improvements in surgical instruments for reducing the stone in the bladder, and enabling the patient to pass it off through the urethra.*—[Sealed 16th June, 1834.]

THIS invention consists of an improved instrument for cutting or crushing the stone in the bladder, and reducing it to such small particles that it may be passed off by the patient without giving him pain.

Fig. 8, Plate VIII., represents the instrument shown partly in section: *a, a,* is a frame made of wood or other suitable material; *b, b,* is the part which enters the bladder, and is represented in this view as open, and in the act of crushing the stone. Fig. 9, shows this part shut.

It will be seen that this portion of the instrument consists of two chaps, the inner sides of which are toothed or jagged for the purpose of breaking or crushing the stone: *c, c,* is a steel spring or wire, connected at one end to one of the chaps, and at the other end to a screw *d,* the use of which will be presently described.

The Patentee says, that instead of having the chaps made to crush the stone, an instrument made upon the principle of a pair of scissors may be used for cutting the stone, as represented at fig. 10.

The mode of operating with this instrument is as follows:—The part *b, b,* as represented at fig. 9, is passed into the bladder; the chaps are then opened by turning the screw *d,* as seen in fig. 8; and when the operator has succeeded in getting hold of the stone between the chaps, he turns the screw *d,* the reverse way, which draws the steel wire or spring *c, c,* and brings the upper chap forcibly down upon the stone, and thereby crushes it. The straight part of the instrument *b,* may be made hollow, so as to form a tube, by means of which any liquid may be injected into the bladder.—[*Inrolled in the Inrolment Office, December,* 1834.]

To JOSEPH BROWN, *of the Minories, in the liberty of the Tower of London, upholsterer, for his invention of improvements in beds, sofas, chairs, and other articles of furniture, to render them more suitable for travelling and other purposes.*—[Sealed 8th September, 1838.]

THERE does not appear to be a single point of novelty in this invention, although the specification is of considerable length, and accompanied by a large sheet of draw-

ings. One part of the invention, namely, the beds, is neither more nor less than a cot upon a large scale, swinging upon pivots, exactly in the same way as a child is generally rocked.

Chairs, tables, sofas, beds, basins, and all descriptions of household furniture are all proposed to be hung in the same manner, for the convenience of being used at sea, in order that they may always hang in a perpendicular position.

Fig. 6, Plate VIII., is a side view of an arm chair upon this principle, or it may be the end view of a sofa. Another mode of suspension is shown in fig. 7, which represents an end view of a cot or hammock suspended by a cord passed over two pulleys fixed in the ceiling.

We think it unnecessary to give any further examples of the ingenuity of the Patentee.—[*Inrolled in the Inrolment Office, March,* 1839.]

To William Edward Newton, *of the Office for Patents, Chancery-lane, in the county of Middlesex, mechanical draftsman, for an invention of an improved method or methods of preparing certain substances for the preservation of wood and other materials used in the construction and fitting up of houses, ships, and other works, which improvements are also applicable to other useful purposes, being a communication from a foreigner residing abroad.*—[Sealed 22d October, 1838.]

This invention has for its object certain processes, by means of which natural or other bitumen or any product derivable from the distillation of bituminous schistus coal, and such substances, may be put into a permanent liquid state, and used in that state, *cold,* either as a waterproof paint for covering fences, wooden palings, or other con-

structions of wood, for the purpose of protecting them from the weather, or for making a composition which may be applied to the construction of roads or ways.

The methods employed in carrying this invention into effect are as follows:—As the bitumen is generally found in a pure and solid state, it must be melted in an iron cauldron or boiler by means of steam; and in order that it may be reduced to a melted state with greater facility, it should be reduced to powder or to very small pieces, the bitumen is then put into the cauldron or boiler, and about ten per cent. of common turpentine is added during the operation of melting. When this mixture is perfectly melted, about seventy-five per cent. of oil of schistus or other mineral oil in a rectified state is to be added, and the whole being well heated, should be stirred for some time to render the mixture of the several ingredients complete, after which the whole is to be poured into an iron reservoir and allowed to cool. When the above preparation is nearly cold, about twenty-five per cent. of turpentine should be added, and the whole well stirred and agitated with a large iron ladle while the turpentine is being added, in order that the consistence of the whole mass of liquid may be uniform.

When this has been done, take ten per cent. of the hydrate of lime and pass it through a wire sieve, and mix it with a sufficient quantity of bitumen (the preparation of which has been described above) until it arrives at almost the consistence of honey; then add to it the mass of liquefied bitumen, and mix them well with a large ladle or other suitable instrument, so that the lime shall be equally distributed throughout the whole mass.

Natural or other bitumen, prepared in this manner, will be found to be in a *permanent liquid state,* and in this state they may be used *cold,* firstly, as a waterproof paint

for covering or preserving from the effects of the weather, bricks, stones, plasters, concretes, woods, metals, millboard, paper, cordage, and any other article requiring such protection; and secondly, as a mastic to be used in the construction of roads or ways.

In this latter instance it will be necessary to add chalk, sand, and small stones or pebbles, in sufficient quantities, according to the situation and circumstances of the case.

Having now described the invention communicated to me, I wish it to be understood that I do not mean to confine myself to the exact proportions in which the above ingredients are mixed, as they may, perhaps, be beneficially varied in some cases; but the proportions mentioned have been found to answer very well, and will serve to point out the manner in which the invention may be carried into effect. And I hereby declare that I claim as the invention secured to me by the above recited Letters Patent, the preparation of a bituminous composition that shall remain in a permanent liquid state without the application of heat, and which bituminous composition may be used in a cold state, as above described.—[*Inrolled in the Rolls Chapel Office, April,* 1839.]

Specification drawn by Messrs. Newton and Berry.

To GEORGE ALEXANDER MILLER, *of Piccadilly, in the parish of St. James's, Westminster, in the county of Middlesex, wax-chandler, for his invention of an improvement in lamps.*—[Sealed 6th February, 1834.]

THE improvement invented by the Patentee is merely a substitute for the wick holder of a common Argand burner, in lieu of which he uses what he calls wick supporters.

Fig. 4, Plate VIII., represents a horizontal view of an

Argand burner constructed upon this principle, and fig. 5, a side elevation of the same. It will be seen that the burner consists of a number of tubes *a, a, a, a,* all of which have separate wicks; *b,* is a stud that takes into a spiral grove, as in ordinary Argand lamps, for the purpose of raising or lowering the wicks.

The Patentee informs us that, by this mode of arranging the wick of an Argand lamp, he is enabled to obtain a more perfect combustion and a more brilliant light than has hitherto been effected.—[*Inrolled in the Inrolment Office, August,* 1834.]

To Frederick Plant, *of Bread-street-hill, in the city of London, fur cutter, for his invention of an improved fur-cutting machine.*—[Sealed 13th January, 1834.]

This invention is described as consisting of a machine which gives a lateral reciprocating motion to a knife for the purpose of cutting the fur or hair from skins. The skin to be operated upon is placed on an endless travelling cloth, and passed between two sets of drawing rollers; and between these two sets of rollers a knife, having a lateral reciprocating motion, is made to act on the skin, which is supported on its fleshy side by a stationary bed placed behind it. Immediately below the knife a steel plate or scraper is fixed, which is made to press against the surface of the skin by means of a spring, for the purpose of raising the fur or hair, and keeping it back to be operated upon by the knife. The skin is gradually moved forward against the knife, and when finished is drawn through the upper pair of drawing rollers and deposited upon a table above.—[*Inrolled in the Inrolment Office, July,* 1834.]

To JOHN WOOLRICH, *of Birmingham, in the county of Warwick, professor of chemistry, for his invention of an improved process for manufacturing carbonate of lead, commonly called white lead.*—[Sealed 11th October, 1838.]

THIS invention is very similar to one patented in December, 1833, by Messrs. Torassa, Muston, and Wood, inasmuch as metallic lead is reduced by mechanical means to the state necessary for it to be converted into a pigment. The two inventions, however, differ in one point; Torassa makes his white lead by mechanical means, aided by the action of the atmosphere alone; whereas, in the present invention, the mechanical means employed are aided by an acid solution.

The invention is thus described:—Metallic lead is to be reduced to small particles about the size of shot, in any convenient manner: the method employed by the Patentee is by running molten lead through a metallic sieve into water. A sufficient quantity of the lead so prepared is to be placed in an hexagonal vessel, about five feet long and twenty inches in diameter.

The charge of lead must then be wetted with an acid solution, consisting of protoxide of lead dissolved in ascetic acid. Rotary motion must then be given to the barrel by suitable gear work, and it will be found that the continued friction of the pieces of lead one against another, aided by the acid solution, will give a product which, at the end of any given time, must be taken away. This product being put into a suitable vessel and kept well stirred, must be acted upon by carbonic acid gas, which is procured by drawing atmospheric air through a charcoal fire: carbonic acid may be obtained in any other manner, but the Patentee prefers the one already mentioned.

The claim of invention is not confined to the use of the above described acid solution alone, as many other acid solutions may be advantageously employed, nor to the size, shape, and materials of which the rotary vessel above mentioned should be constructed; but the Patentee claims, as the invention secured to him by the present Letters Patent, the manufacturing of carbonate of lead, commonly called white lead, by means of friction, aided by the presence of acids, as above described and explained.—[*Inrolled in the Inrolment Office, April,* 1839.]

To Eugene Richard Ladislas De Breza, *of Paris, in the kingdom of France, now of St. Martin-street, Leicester-square, in the county of Middlesex, gentleman, for his invention of a chemical combination or compound for rendering cloth, wood, paper, and other substances indestructible by fire, and also preserving them from the ravages of insects.*—[Sealed 20th February, 1838.]

The chemical compound alluded to in the title of this patent consists of the following materials, and mixed in the following proportions:—For linens and unbleached goods, take two pints and a half of water, and after raising the temperature to 190 degrees of Fahrenheit's thermometer, add one ounce of alum, with one ounce and a half of sulphate of ammonia, half an ounce of boracic acid, one drachm of glue, the best and finest that can be procured, and add to the whole one drachm of starch dissolved in a small quantity of water.

Before the starch is added, the temperature of the mixture should be raised to at least 212 degrees of Fahrenheit; care should also be taken that the several ingredients are introduced in the order above mentioned, and also that

each one is dissolved in the water before the next is added. The mixture being thus prepared, the goods to be preserved are operated upon in any suitable manner; for instance, plain unbleached goods may be immersed in the compound, and be allowed to absorb as much as possible, after which they must be pressed or wrung hard, in order to get rid of the redundant liquor; they are then dried in any convenient manner. Printed goods, when the colours are fast, may be treated in the same manner; but when the colours are not fast, the mixture should be applied with a sponge, care being taken that they are not wetted too much, otherwise the colours may perhaps run.

When timber is to be operated on, it is to be put into tanks and covered over with the mixture, which is raised to a temperature of at least 160 degrees.

For preserving paper or pasteboard, the mixture may be put into the vat containing the pulp from which the paper or pasteboard is to be made, or the paper may be immersed in the mixture after it is manufactured.

When the invention is to be applied to theatrical scenery already in use, sheets of paper, prepared in the manner described, should be pasted at the reverse side; but for new scenery the canvass may be steeped in the solution.

It is observed that it is not to be supposed the said composition will render the various articles indestructible to fire, but that it merely prevents them from bursting into flame, and by that means communicating the fire from one thing to another.

In conclusion, the Patentee states that he is aware that some of the ingredients above mentioned have been used for similar purposes to which his invention is intended to be applied; but what he claims as his invention, is making a composition consisting of alum, sulphate of ammonia,

boracic acid, glue, and starch, mixed in the above order and proportions, to be applied to various articles; and which composition will render them indestructible by fire, and protect them from the ravages of insects.—[*Inrolled in the Inrolment Office, August*, 1838.]

To STEPHEN GEARY, *of Hamilton-place, New-road, in the county of Middlesex, architect, for his invention of improvements in the preparation of fuel.*—[Sealed 26th May, 1838.]

THE materials employed to make this fuel are pitch, to be obtained from coal tar or caoutchouc; clay, finely powdered, or sand; cinders, either of wood or coal; sawdust, spent bark, and small coal, to which is added a small quantity of sulphuric acid. The pitch is first melted; the other materials are then severally combined with it when in a heated state, care being taken that the pitch is kept well stirred while the other materials are being added. When about half the required quantity of small coal has been introduced, a small quantity of sulphuric acid is to be poured in, and during the effervescence occasioned by its introduction, the remaining portion of the small coal may be added.

The fuel being thus prepared, is then poured into moulds to be formed and pressed, after which it will be fit for use. The Patentee states, in conclusion, that he is aware that many of the articles mentioned have been used as fuel, he, therefore, does not claim either separately or in combination; but what he does claim as his invention, is the introduction of sulphuric or any other acid in any article to be used as fuel.—[*Inrolled in the Inrolment Office, November*, 1838.]

To Samuel Bagshaw, *of the parish of St. James's, in the county of Middlesex, for his invention of an improved filter for water and other liquids.*—[Sealed 6th November, 1834.]

The invention before us is so imperfectly described, and, in our opinion, so decidedly void of novelty, that we almost despair of persuading our readers that we are conveying the Patentee's meaning correctly.

The specification commences by setting out a composition consisting of five parts of pulverised stone, five parts of common charcoal, and two parts of potter's clay, which are to be mixed up with water to the consistence required for moulding. Of this composition a ring is to be made the eighth of an inch thick, three inches deep, the diameter, of course, to be regulated by the size of the vessel in which it is to be placed; across this ring are to be placed some flat pieces of the same material, we suppose made dry and hard, the eighth of an inch thick, and three inches deep. Another similar ring is then placed inside the vessel, we presume on the top of the other one, and a perforated cover laid over it. The filter is then to be filled to a proper depth with layers of sand, &c. First, a layer of coarse river sand, then a layer of gravel coarser than the sand; after which, a layer of pebbles and pieces of charcoal, and this completes the apparatus.—[*Inrolled in the Inrolment Office, April,* 1835.]

To Robert Garton, *of Beverley, in the county of York, millwright, for his invention of improvements in presses.*—[Sealed 25th January, 1838.]

This invention is a mode of combining screws and wedges, whereby considerable pressure may be obtained. Fig. 1,

Plate VIII., is a section of part of a press: *a, a*, is the framework; *b*, a moveable pressing wedge, which is forced under the upper wedge *c*, by means of a screw *d*, passing through the under wedge *b*. A cog wheel *e*, is fixed on one end of the shaft of the screw *d*, and the other end of the screw turns in a bearing in the framework.

Two sets of anti-friction rollers *f*, and *g*, are placed under the wedges, for the purpose of making the press-work easier. The Patentee disclaims the use of the screw and wedge separately, but claims them in combination, as described, for the purpose of pressing.—[*Inrolled in the Inrolment Office, July*, 1838.]

To WILLIAM RATTRAY, *of Aberdeen, North Britain, manufacturing chemist, for his invention of certain improvements in the manufacture of gelatine, size, and glue.* [Sealed 31st May, 1838.]

THE claim of invention set forth in the specification of this patent, is for the introduction of sulphurous acid into the manufacture of gelatine, size, and glue. The method of carrying the invention into effect is described nearly in the following manner:—A sufficient quantity of the cuttings and roundings of skins and other substances, known by the name of scrows or scrolls, is put into a vat or tank and entirely covered with water, and there allowed to remain for some days until the scrows begin to putrefy; they are then taken out and cleansed in fresh cold water, by being operated upon by stampers. The scrows are subjected to this operation twice or thrice, or until such a time as the water runs clear from the vessel in which they are being cleansed. They are then to be placed in a vessel made of wood, lead, or any other suitable material, and a small

quantity of water, strongly impregnated with sulphurous acid, is poured in; the scrows are then entirely covered over with water, and allowed to remain in the vessel from twelve to twenty-four hours, after which the liquor may be run off, and the scrows be again subjected to a fresh supply of the acidulated water, if thought desirable.

After the scrows have been thus subjected to the action of the acid long enough, they must be removed from the vessel and washed in clean water by the stampers, after which they are to be put into a vessel; hot water, at about 120 degrees of Fahrenheit, is poured in, and run off almost immediately. A fresh supply, at the same temperature, is then obtained, and the scrows are allowed to remain immersed in it for about twenty hours, care being taken that the temperature is constantly kept up to the original pitch by means of flues, or in any other convenient manner.

When the scrows have remained in the water the time specified it should be drawn off, and a fine gelatine will be found, which may be strained through several thicknesses of woollen cloth.

A further supply of hot water at a higher temperature, say 130 degrees of Fahrenheit, is then to be poured in, and kept up to the original temperature in any convenient manner.

The scrows should remain immersed in this for about twenty hours more, when a further supply of gelatine will be obtained, which must be strained off in the same way as the former.

The scrows may then be subjected to the action of, another supply of hot water at a still higher temperature, when a similar result will follow; and, in fact, the operation should be continued until no gelatine remains to be extracted.

The Patentee says, in conclusion, that he does not mean

or intend to claim as his invention, any of the apparatus to be employed, nor yet subjecting the scrows or scrolls to putrefaction, as that has been done before; and he wishes it to be understood that he claims the use of sulphurous acid in the manufacture of gelatine, size, and glue, in whatever manner it may be employed, as it must be evident that the said acid may be used in the first instance, when the scrows or scrolls are steeped in the water, in order to putrefy, and in other parts of the process.—[*Inrolled in the Inrolment Office, November,* 1838.]

To Edward Galley Giles, *of Lincoln's-inn-fields, in the county of Middlesex, gentleman, for certain improvements on apparatus for engraving on copper and certain other substances, being a communication from a foreigner residing abroad.*—[Sealed 15th November, 1834.]

The present invention is described as consisting of a sort of double pentograph, or rather a modification of the instrument in ordinary use, for reducing and engraving on copper or other substances, and with a certain addition thereto, by means of which the Patentee states he can transfer a drawing, either reduced or full size, to a plate of copper without the trouble of first reversing it, as it is necessary to do when the ordinary pentograph is employed.

The invention is described in the specification at considerable length, but not with any great degree of clearness; we are, therefore, unable to give our readers any further description of the construction of the instrument.—[*Inrolled in the Inrolment Office, May,* 1835.]

To ANDREW PAUL, *of Doughty-street, St. Pancras, in the county of Middlesex, surgeon, A.B., and M.B., for his invention of an improved hydraulic pump, douche, or jet d'eau, applicable to all the purposes of lavement in medical operations.*—[Sealed 30th July, 1838.]

MY invention of an improved hydraulic pump, douche, or jet d'eau, applicable to all the purposes of lavement in medical operations, consists in the arrangement of a convenient and compact apparatus for the bed-chamber, in which all the parts and implements required to be used for the purposes of medical lavement are enclosed in a portable chest, capable of being locked up and removed from room to room, or for travelling.

The construction of this apparatus is shown in Plate VIII., in which fig. 13, is a top view of the apparatus, the lid of the chest being thrown open; fig. 14, is a front view of the same, the front of the chest being removed and the pan shown in section, for the purpose of exhibiting the internal arrangement of the operating parts of the apparatus; fig. 15, is a side view of the chest, the moveable end being slidden out in order to exhibit the pump and its appendages; and fig. 16, is a section taken transversely through the chest and through the middle of the pan: similar letters of reference pointing out similar parts in all the figures.

The chest is an oblong square box *a, a, a,* the lid *b,* of which rises on hinges, with quadrant guides *c, c.* The end *d,* of the box slides in grooves, and is capable of being removed, as in fig. 15, for the purpose of gaining ready access to the pump when required. The seat *e,* is moveable, as in ordinary night chairs; it covers the mouth of the pan *f,* which is to be constructed of thin metal. The top or ledge of the pan is supported in a horizontal partition *g, g*; and

against the side of a vertical partition *h*, the pump *i*, is attached, which is of the ordinary construction of lift pumps; *k*, is the handle or lever for working the piston of the pump.

When the apparatus is in action the pan must contain about a gallon of water, either pure or impregnated with medicinal matters; and the water may be warm or cold, as the circumstances of the patient may require. A pipe *l*, leads from an aperture in the bottom of the pan to the under part of the barrel of the pump, by which the water is supplied to the pump; *m*, is a pipe connected to the top of the pump barrel, which pipe leads to the aperture of the jet in the centre of the pan.

The jet tubes may be of different constructions, either to project the water upwards in a shower, or to conduct it through a tube in a stream. Several different descriptions of jet tubes are appended to the apparatus, some of which have flat perforated rose heads, for the purpose of directing a shower with any required degree of intensity against the part affected: other jet tubes have open ends for conducting the water through a bent tube or flexible pipe into the bowels, as lavement, if necessary. These jet tubes may be conveniently suspended in the angles of the horizontal partition, and whichever of them may be required to be brought into use, must be screwed into the central aperture in the bottom of the pan.

The pan being charged, as described, with a suitable quantity of water, either pure or medicinally impregnated, the patient, when sitting upon the seat, immediately over the orifice of the jet, works the pump with any degree of rapidity that may be required to give greater or less force to the jet, which will cause the water to bound up through the jet, either in a shower or a stream, according to the construction of the jet; and the operation may be con-

tinued for any length of time desired, as the water, on descending, passes by the open orifice through the pipe to the pump to be thrown up again, and so on continually as long as the pump is kept in action.

When the operation of lavement is done, the water may be drawn off from the pan through a bent tube to be attached to the orifice in the centre of the pan, by working the pump till the water is expelled. But I would observe, that it is desirable to leave a small quantity of water in the pump barrel, in order to prevent the packing of the piston becoming dry and hard.

Plugs may be screwed into the orifices in the bottom of the pan, to close them when the pump is not in use, and then the pan may be employed as a foot bath.

I have said that four different sorts of jet tubes may be packed in the apparatus by letting them drop into holes in the angles of the horizontal partition. The bent tube and flexible tube, when out of use, may be also held by buttons and loops attached to the inner part of the sliding end piece; and the vacant space under the pan may have a drawer for towels and other articles.—[*Inrolled in the Rolls Chapel Office, January,* 1839.]

Specification drawn by Messrs. Newton and Berry.

To FELIX MACARTAN, *of St. Martin's-lane, in the county of Middlesex, for his invention of improvements in treating the waste matters resulting from the washing of wool and woollen fabrics, being a communication from a certain foreigner residing abroad.*—[Sealed 8th November, 1838.]

IT is well known that in addition to the grease found in wool, that there is much oil and soap employed in the manufacture of wool into various fabrics, which, in the

course of preparing wool, and in its progress of manufacture, are generally washed out and carried away with the water employed in the process of washing and cleansing, hence such matters are wasted.

Now, the object of the invention is to preserve the waters used in washing and cleansing the wool and woollen fabrics, and the matters mixed with those waters, in order to obtain therefrom the grease or oil, and other useful matters, which have heretofore been thrown away. And, in order to give the best information in my power for carrying out the invention, I will proceed to describe the process which I believe to be the best for carrying out the invention.

The wash waters in which wool and woollen fabrics (in the course of manufacture) have been washed and cleansed, are to be preserved by receiving them in suitable tanks or receivers, to which is to be applied acid. I prefer sulphuric, acetic, or pyroligneous, till the mixture tinges blue paper (litmus paper). The mixture thus prepared is to be submitted to heat in open boilers, or other suitable vessels, in order to evaporate the aqueous portion thereof when boiling; the scum, which will rise to the surface, should be taken off and collected.

The process of evaporation should be continued till the contents of the boiler is reduced to about one-sixth of the whole. The product thus obtained is to be mixed with about one-fourth of its measure of scum. This mixture should be kept in cisterns, or other suitable receivers, until fermentation begins to take place, and to it should then be added so much of the original wash waters previously decomposed by acid, as will be equal to the product before the scum was added.

It should be observed, that the additions of scum and of the original wash waters is especially to facilitate the pressure hereafter mentioned. The whole, having been well

mixed, is to be placed in bags of cotton or suitable material of sufficiently close texture, and then left to drain, which being sufficiently done, the bags are placed in a square iron or other suitable shaped vessel, and submitted to a very gradual pressure, each layer of bags being separated from the next by basket-work, or other suitable means, adding pressure by gentle degrees, allowing some minutes between each addition of pressure. And in order to facilitate the expressing of the grease or oil from the contents of the bags, heat should be kept up by steam or other means (preferring steam), as is well understood, to the press and its contents.

The oil or grease thus expressed is mixed with water, which will separate by the difference of gravity; and thus the greater part of the valuable contents of the wash waters will be obtained for use, in place of their being thrown away together with the water and wasted, as heretofore. The residue in the bags will be found useful as a manure and other purposes.

If, on heating the water decomposed by acid, it should be found that almost the entire quantity of greasy matters contained in them should turn into scum, the operation should be discontinued and the water thrown away, but the scum should still be preserved. The water which has drained from the bags, together with the water which has separated from the grease after pressure, may be evaporated to dryness, and the remaining substance calcined or burnt in a reverberatory furnace, or in close vessels to obtain the gas: the product from the calcination is to be lixiviated in order to extract alkaline salts, which it contains, by the ordinary chemical processes.

I would remark, that although I have thus described the process which I believe to be the best for carrying out my invention, at the same time I would have it understood

that I do not confine myself thereto, nor do I claim any of the processes herein mentioned, when not employed for the purpose of separating and obtaining for use the grease or oil, and other matters contained in the wash waters, as herein explained. But what I claim is, the treating of the waste matters resulting from the washing of wool and woollen fabrics, in such manner as to separate the oil or grease, and other useful matters, from the wash waters, as above described.—[*Inrolled in the Inrolment Office, May,* 1839.]

To JOHN ROGERS, *of Princes-court, Westminster, in the county of Middlesex, gentleman, for his invention of certain improvements in paddle-wheels.*—[Sealed 10th July, 1835.]

THIS invention is for an improved method of adapting the float boards, and placing them in such a manner that they will present the greatest resistance to the water when immersed; and they leave it without lifting the water, as the flaps of ordinary paddle-wheels do.

The manner of effecting this is by employing sets of float boards so arranged, that upon entering the water they may present a very extended surface; and upon leaving it, the water be allowed to escape through or between them.

The arrangement set forth in the specification will be better understood by reference to fig. 2, Plate VIII., which is a diagram representing a front view of part of a paddle-wheel, and shows the situation and shape of the float boards; fig. 3, is a side view of the same.

The paddle-wheel is composed of three rings *a, a,* and *b,* the middle one *b,* being of considerably larger diameter than the other two; *c, c,* is one set of float boards attached

to the rings *a, a*; *d*, is another float board, affixed to the ring *b*, which enters the water first; and there is a float board *e*, also affixed to the ring *b*. Slots or holes *f, f, f*, are made in the several paddles or float boards, to allow the water to escape when the float boards are leaving the water.

The Patentee states, in conclusion, that he does not intend to confine himself to the precise forms or shapes of the float here represented, but that the particular feature of novelty in his invention is the extended propelling surface that he obtains, and which, owing to its being made up of parts, is not liable to the same objection that fixed paddles generally are, namely, lifting the water as they emerge.—[*Inrolled in the Inrolment Office, January,* 1836.]

To William Busk, *of Bankside, Surrey, engineer, for his invention of certain improvements in propelling boats, ships, or other floating bodies.*—[Sealed 10th July, 1835.]

The improved method of propelling set forth in the specification of this patent, is stated to be upon the principle of Barker's mill, which the Patentee has endeavoured to render subservient to the propelling of vessels; and the manner in which he carries his invention into effect will be understood by reference to fig. 11, in Plate VIII., which represents the apparatus: *a*, is a box or chamber situated in any convenient part of the vessel, and supplied with water by a pipe *b*. The water having a tendency to press out the sides and bottom of the vessel in which it is contained, will, of course, escape with considerable impetuosity wherever it can find an outlet; and as this outlet is situated at *c*, which is a sluice gate, the water will rush

out, and thereby propel the vessel in the opposite direction, as shown by the arrow.

The chamber *a*, is to be supplied with water by a steam engine, which is constantly pumping it in by the pipe *b*, as before stated.

The Patentee says, he is aware that schemes have been suggested to propel vessels by forcing water by pumps or other machinery, but his invention differs from others, as they are all schemes for forcing water against water, which his is not; and it is stated, in conclusion, that although the apparatus, as set forth, will answer the purpose to which it is applied, yet the Patentee does not confine himself thereto, but claims as his invention any apparatus by which a column of water, allowed to escape by its own gravity, has a tendency to propel a vessel forward in an opposite direction to which the water rushes out.—[*Inrolled in the Inrolment Office, January,* 1836.]

[The philosophy of this plan does not appear to us to be at all conclusive.—Ed.]

To Henry Stephens, *of Stamford-street, Blackfriars-road, in the parish of Christ Church, and county of Surrey, writing fluid manufacturer, for his invention of certain improvements in inkstands or inkholders, and in pens for writing.*—[Sealed 28th March, 1837.]

My invention of certain improvements in inkstands or inkholders, and in pens for writing, consists, in the first place, in an improved adaptation and construction of stoppers applied to that description of inkholders commonly called fountain inkstands, that is to say, in which the supply for the pen is taken from the lower part of the fluid instead of the upper, as in common open-mouthed inkstands. The

construction of such fountain inkholders being well understood, it is not necessary for me particularly to describe them, but to state that my improved stopper is of that kind commonly called "spigot and fauset," or the cock or tap commonly used with all kinds of fluids, and which, as adapted to this kind of inkstand or inkholder, has a peculiarly formed opening, way, or passage made through the plug, fauset, or cone, for the purpose of allowing free access for the pen to the fluid when introduced into the holder for the purpose of taking the supply or dip. The said opening or way to the interior of the inkholder is formed at one side of the plug or spigot, instead of through the middle thereof, as in the common construction of cocks; and the mouth of the inkstand or holder can be closed at pleasure by turning the plug or spigot.

These improvements will be better understood by referring to Plate IX., in which are exhibited two modifications or variations of the adaptation of said the improved stopper to fountain inkholders. Fig. 1, is a side elevation of a fountain inkholder of a form which I previously invented, but to which is now adapted the improved stopper, the cone or plug being in this instance placed horizontally across the mouth or aperture; fig. 2, is a front elevation of the same; fig. 3, is a vertical section taken through the inkholder, showing the aperture or mouth open; and fig. 4, is another similar section, with the aperture closed: fig. 5, is a view of the spigot or plug detached, showing the form of the cpening or way made through the same: *a, a,* is the interior of the vessel or inkholder; *b,* the neck or mouth-piece in which the fauset is formed; *c,* the mouth or opening of the inkstand; *d,* the spigot, plug, or stopper, having the way or recess *e,* excavated for the admission of the pen into the fluid.

It will be seen, by inspecting the drawing, that if the

way or recess *e*, is turned towards the mouth of the ink-holder, as shown by dotted lines in fig. 5, there will be a free access or passage for the pen to the fluid; and that on turning the spigot or stopper partly round, the solid part of the plug will close the way, and exclude the air, as seen in fig. 4. Figs. 6, 7, 8, 9, and 10, are similar representations to the foregoing, showing another modification of the adaptation of my improved stopper, in which the spigot, plug, or stopper, is placed vertically across the mouth or aperture of the inkholder; and the way or recess *e*, is formed longitudinally in the spigot or plug instead of transversely, as in the former instance: the same letters of reference being marked upon corresponding parts, the foregoing description will apply to these figures, and therefore no further description will be necessary. But I would here remark, that although I have shown the spigot or plug placed in the vertical and horizontal positions, yet they may be placed in any angle thereto, which may be required or thought more convenient, and that they may be made of glass, earthenware, or any other suitable material.

My invention of improvements in pens for writing, consists in a new mode of manufacturing pens from quill, or horn, or whalebone, or tortoise and other shells, or ivory, or any other hard, horny, bony, or other flexible animal matters, which I effect by the following process:—I first take the materials, of quill, horn, or other animal substance, of the requisite thickness, in as dry a state as I can procure them, and cut out the requisite forms of the pieces for the production of the pens by means of a cutting punch or other instrument, in a similar manner to that which is usually pursued in the manufacture of steel and other metallic pens. I then procure a pair of dies, shaped according to the model or required curved or bent form of the pens intended to be made. I then heat those dies to a

degree, (say from about 200 degrees to 300 degrees Fahrenheit,) that is, sufficiently to harden the material without destroying its texture; and then having placed the cut pieces of quill or other animal material between the heated dies, and subjected the same to pressure, I suffer the dies and pieces of animal material so placed to cool before removing them. When the dies are quite cold, the pieces of quill or other animal substance will have become set or fixed in the required form, and may then be removed.

In order that the slit may be properly made in the point of the pen, and not be allowed to pass too high up, I place the pen under a cutting punch and die, and cause a small orifice to be perforated at the place to which I wish the slit to extend; and in a similar way, or by any other convenient means, I then cut the slit at the point of the required length. The pens having been thus manufactured, they may, in order finally to complete them, require scraping or finishing with a common penknife on the edges, in order to take off any irregularities or roughness, and also to adjust the points.

Holders will be required in using these pens, similar to those employed for metallic pens; or, if preferred, small pieces of the material may be placed under the operation of the heating and pressing dies to attain the required curved or dished form previous to being cut or shaped to the required size and figure of the pen; and after they are thus curved or dished, they may be submitted to the action of a cutting or shaping tool to cut off the superfluous parts, and give the pen the required size and figure, the curved or dished pieces being held within the cutting or shaping tools by parts thereof, which are also of the dished or curved figure of the pen: such pieces may have the slits formed in them afterwards, as above stated, or by any suitable means.

I sometimes apply a varnish to these pens after they

have been thus finished, which may be either the common lacker prepared of shell lac dissolved in spirit of wine, or cover them with what is commonly called Japan varnish, or any other varnish, which will serve to prevent the action of the ink or fluid upon them.

Having now particularly described my improvements, I would, in conclusion, remark, that what I claim as my invention is, firstly, the improved construction or adaptation of the above described stoppers to fountain inkstands; and secondly, the mode, method, or process of manufacturing writing pens from quills, horn, whalebone, tortoiseshell, or other hard, horny, flexible, animal material, as above described.—[*Inrolled in the Rolls Chapel Office, September,* 1837.]

Specification drawn by Messrs. Newton and Berry.

To JAMES HARDY, *of Wednesbury, in the county of Stafford, iron-master, for his invention of certain improvements in rolling, making, or manufacturing shafts, rails, tire-iron, and various other shafts of metal, and in the machinery or apparatus used in the same.*—[Sealed 2d June, 1838.]

THIS invention of certain improvements in rolling, making, or manufacturing shafts, rails, tire-iron, and various other heavy articles of metal, and in the machinery or apparatus used in the same, consists, in the first place, in adapting the principles set forth in the specification of my former patent, granted by his late Majesty King William the Fourth, and sealed at Westminster, 4th April, 1835, for manufacturing axletrees for carriages, and other cylindrical or conical shafts; and applying the same principles to the manufacturing of certain other articles, as square or poly-

gonal shafts for machinery, rails for trams or railways, and the tire-irons for wheels and various other articles, by a certain process of rolling bars of iron to certain figures; and after fagotting such rolled bars together, bringing them into the required form by rolling or by swages attached to a tilt-hammer, or metal helve.

Secondly, I introduce as portions of the said masses of metal, longitudinal bars of steel, in such situations as may be required for particular purposes, and roll or weld these steel bars into combination with the iron.

Thirdly, instead of continuing to pass these masses of iron, or of iron and steel, between rollers always revolving in one direction, until the mass is reduced to its required figure, I cause, by suitable arrangements of machinery, the rollers to reverse their rotary direction after every operation, in order that the mass of metal may be pressed out or extended lengthwise in both directions; which mode of treatment tends greatly to improve the tenacity of the metal, and to facilitate the operation of rolling.

Having now stated the features of my present invention, I proceed to show the manner in which the same are carried into effect:—I procure the best scrap iron or other iron, and cleanse it from rust and other impurities, which I work into flat bars, in the ordinary way, and then cut down and pile the bars according to the lengths and substances required. These piles are then, in a furnace or hollow fire, brought to a welding heat, and afterwards welded and reduced to segmental figures between revolving rollers, as described in my former specification. These segmental bars are then placed radially round a central rod to make a solid bar; and after being again brought to a proper heat for welding, are, in their combined or fagotted state, formed into one compact cylindrical mass, by means of rolling or swaging, as in my former specification. In this heated

and compact state, the cylindrical mass is then passed through other grooves in the rollers or swages, having suitable indentations, in order to bring the mass into the required figure or form of bar for the rail of a tramway or railroad, or for the tire of a wheel, or shaft of a square, or polygonal shape for machinery, or other form, for any purpose, save and except those claimed under my former patent.

In the peculiar way in which I introduce steel into the fagotted masses of iron, my object is to unite the steel with the iron, in such proportions and in such positions that the steel may retain its same proportion to and position in the mass, after the process of rolling or swaging into the required shape has been performed; in order that the portions of steel so combined with the iron may, by the rolling or swaging operations, be brought into such situations of the rail or tire-iron, or other article to be produced, as would, when in use, be most exposed to the effects of wear and tear from friction or severe pressure.

The manner in which I carry this object into effect, will be best understood by reference to Plate IX., in which fig. 1, represents in transverse section several flat bars of iron, *a, a, a,* piled together with a bar of steel *b,* placed on the top of the pile. These, in their combined state, having been properly heated in a furnace, are to be passed between suitable rollers for the purpose of welding all the bars of iron, and that of steel, into one compact bar of a segmental form, as shown in the sectional figure 2. A number (say eight) of these segmental bars are then fagotted upon one cylindrical shaft or rod *c,* as represented in the section fig. 3, which may then be heated and welded together by passing the mass between rollers or swages, and thus formed into a cylindrical or polygonal

or square shaft of iron coated on the outside with steel, as at figs. 3, 4, and 5.

In forming the bars for trams or railways, or for tires for wheels, in which it may be advantageous that the surface most subject to wear should be of steel, I fagot together a number of segmental pieces on a central shaft, as at fig. 6, one or more of which segmental pieces shall be coated on the outside with steel, in the way described, in reference to figs. 1, and 2. I weld these fagotted pieces together into one cylindrical mass, and then roll or swage and draw out the cylinder into the form of a rail, as shown in section at fig. 7; or of a tire-bar, as shown in section at fig. 8, or into any other form that may be required: observing, that the steel portion on the surface shall be ultimately in that part of the bar when so rolled or swaged, which may be required to resist the effect of wear and tear from friction or pressure.

Suppose it were required to produce in the same bar alternate segmental portions of iron and steel for boring tools, primers, taps, and a variety of other purposes, I either combine a fagot of iron and steel, or steel faced and iron radial bars alternately, and weld them as above described (see fig. 9): or I prepare the metal by piling flat bars of steel and iron in varying proportions, as may best suit to effect the object required (as shown *a, a, a,*) and *b*, fig. 10, roll such piles of steel and iron into a segmental bar, as fig. 11. I then proceed to combine or fagot and weld, as already described, into the cylindrical bar, shown at figs. 12, or 13. Supposing a steel centre for coining dies, or other similar purposes, should be required. By combining iron segmental bars round a steel centre bar, and welding, as before described, that object is attained, as shown in fig. 14. From these details, it will be evident that any com-

bination of iron and steel, whether for internal coating of cylinders, (as shown at figs. 15, and 16,) or in concentric circles; as shown at figs. 17, 18, and 19, whether for purposes of ornament or utility, can be produced by the above described method more readily and more accurately than by any other yet in use.

The advantages to be derived from the third head of my invention, viz., applying alternate rotary motions or reversed motions to the rollers for rolling of iron or steel, or of iron and steel combined in a heated state, may be shown in a few words. The ordinary and universally adopted method of rolling these metals in a heated state, is by means of rollers continuously revolving in one direction; hence, the metal under operation, when it has passed through the rollers, has to be lifted up and drawn over the upper roller, until its extreme end has reached the other side. It has then to be presented to the succeeding groove by the workman, to be passed through in the same direction as before; and this process is continued successively until the metal is reduced to its required figure. By thus continually presenting the same end of the bar to the rollers, and pressing the metal always in the same direction, the cementing principle (as I conceive) in a fluid state, is continually expressed towards the other end, thus enriching one portion of the metal by impoverishing the other; hence, the inequality of bar iron generally, one end of the same bar being often found to be tough and tenacious, whilst the other is crystallized and brittle.

By my improved method, this and other evils are avoided; for by reversing the rotary motion of the rollers after each operation, and presenting, alternately, each end of the shaft or bar to the opposite side of the rollers, and passing it through the succeeding grooves in contrary directions successively till the figure required is attained,

an article of uniform quality is produced with less than half the labour, and little more than half the time and fuel consumed in the usual way.

Having thus stated my improvements, I proceed to define exactly what I claim as my invention. First, the application of iron and steel, or of iron and steel combined, prepared in segmental bars fagotted and welded together into one solid mass, as before described, to the making or manufacturing of square, polygonal, or other shafts not included in my former patent; and to the making or manufacturing of crank axles for locomotive and other engines, to the formation of rails, tire-iron, and to all other purposes to which it may be applicable.

I likewise claim the adaptation and use of any known machinery or apparatus for communicating an alternate rotary motion for reversing the action of the rollers for the rolling of iron or steel, or any combinations of iron and steel in a heated state, for the purposes above set forth.—[*Inrolled in the Rolls Chapel Office, November,* 1838.]

Specification drawn by Messrs. Newton and Berry.

To Robert Stein, *of Edinburgh, Esq., for his invention of an improved steam engine on the rotary principle.*—[Sealed 7th May, 1833.]

This invention consists of a hollow cylinder, having a shaft passing through its centre; and this shaft has one or more pairs of pistons attached to it, which are described as connected in such a manner that they form an ordinary hinge joint on the said shaft, and fill up a space in the direction of the radius between the shaft and the cylinder, and revolve freely therein, while certain bolts, passed through the said pistons, attach the pistons to the shaft or to the cylinder

alternately, during their revolution. This contrivance produces an alternate action of the pistons, and is so arranged, that with the assistance of a fly-wheel, a continuous rotary motion is given to the shaft upon the introduction of steam into the cylinder, and without the intervention of any crank motion.

Plate IX., fig. 1, is a transverse section of the engine, with one pair of pistons only: *a*, is the cylinder; *b*, the main shaft; *c*, and *d*, the pistons; *e*, the induction, and *f*, the eduction pipes; fig. 2, is a detached view of the main shaft, with a block *g*, fixed upon it, made in the form of a ratchet wheel round its periphery, the object whereof will be hereafter explained; figs. 3, and 4, are separate views of the pistons *c*, and *d*, which, when placed together upon the main shaft, fig. 2, form the ordinary hinge joint, as above described; *h*, *h*, and *i*, *i*, being the parts through which the main shaft passes, as seen in fig. 5. The notches *k*, *k*, in the pistons, are made for the purpose of allowing the steam to enter the cylinder when the pistons are in contact; *l*, *l*, are mortices made in the pistons, and into which bolts are placed, and are allowed to slide up and down; one end of the bolts is cut to correspond with a nick in the cylinder, and the other end is cut to correspond with the notches formed in the ratchet *g*.

The Patentee proceeds to describe the action of the machine, and the mode of setting it to work:—The pistons being in the position represented in fig. 1, steam is admitted into the cylinder by the induction pipe, when the piston *c*, will resist the action of the steam by means of the bolt being at that time shot into the nick cut in the cylinder; the other piston *d*, will, therefore, be driven round, and its bolt being shot into the ratchet teeth, it will carry the shaft *b*, and ratchet wheel *g*, along with it, and drive the

air out of the cylinder through the exit pipe, until it arrives close at the back of the other piston *c*. In this position the two pistons *c*, *d*, would, of course, remain stationary, did not the impetus of the fly-wheel lend its aid, which it now does, and thereby drives both the pistons and the shaft onward, until the opening formed between them by the notch *k*, arrives opposite to the steam pipe, when the steam rushing in, will now force the piston *c*, forward, and thus the rotary motion of the main shaft be continued.

The Patentee says, in conclusion, that it is evident that four, six, eight, or more pistons may, if desired, be introduced with advantage, if the cylinder were large enough, and also the engine might be worked by the expansive force of hot air or gas, as well as steam. He, therefore, claims as his invention, the engine hereinbefore described, the pistons of which turn its main shaft by means of bolts, acting in the manner hereinbefore described.—[*Inrolled in the Inrolment Office, November*, 1833.]

To JAMES MICHELL, *of Truro, in the county of Cornwall, gentleman, for his invention of an improved process in smelting argentiferous ores.*—[Sealed 22d June, 1835.]

THE improved process specified, consists in adding a quantity of sulphur or iron pyrites to the argentiferous ore, during the process of smelting, providing such ore does not contain sufficient sulphur or arsenic in itself, so as to render such addition unnecessary; and after having by this means produced a sulphuret, a number of charges of ore, which contain little or no sulphur, are added, until sulphuret is not capable of concentrating more silver, when an additional quantity of sulphur and arsenic, or iron

pyrites, must be added, or else a charge of ore, which contains considerable quantities of sulphur. The quantity of sulphur and arsenic, or iron pyrites, to be introduced is, three hundred weight of sulphur and arsenic, or six hundred weight of iron pyrites, to every ton weight of argentiferous ore. The claim of invention is, the adding a successive number of charges of calcined argentiferous ore, to be fused with a sulphuret; whether such sulphuret be made by adding sulphur and arsenic, or iron pyrites, to a first charge of ore, which may contain little or none of these substances; or whether the sulphuret be made of a first charge of argentiferous ore, which may contain a sufficient quantity of sulphur and arsenic, or iron pyrites, without the addition of any of these substances by themselves.—[*Inrolled in the Inrolment Office, December,* 1835.]

To John Isaac Hawkins, *of Pancras Vale, in the county of Middlesex, civil engineer, for certain improved instruments for facilitating the cure of disease by administering galvanic influence into the human body, being a communication from a foreigner residing abroad.*— [Sealed 13th March, 1834.]

The invention now under our notice, consists in administering galvanic influence in a mild and gentle manner, in place of the shocks given by the galvanic apparatus at present in use. The Patentee has described several ways of administering galvanism under different circumstances for the cure of various diseases, and the apparatus employed, although differing in shape to suit circumstances, is, in principle, essentially the same; we shall, therefore, confine ourselves to the explanation of one or two descriptions. For the cure of toothache, the Patentee has an ap-

paratus consisting of two metal plates, one of silver, the other of zinc, the edges of the two being soldered together. The plates must be of a shape and size suitable to go inside the mouth, and be placed upon the gums.

In some diseases the outer skin may be in such a torpid state, as to withstand the gentle effects of the apparatus; in such cases an incision should be made, and the galvanism conveyed direct to the inner skin, by which it will be communicated to the nerves, and the whole system, by this means, be roused from its torpidity into a wholesome and natural state of exertion.—[*Inrolled in the Inrolment Office, September,* 1834.]

To JACOB PERKINS, *of Fleet-street, in the city of London, engineer, for his invention of certain improvements in the apparatus and means of producing ice, and in cooling fluids.*—[Sealed 14th August, 1834.]

THE method employed for refrigerating fluids, consists in surrounding the vessel containing the liquid to be cooled or frozen with a volatile spirit, which will very quickly evaporate at a low temperature. The volatile spirit to be employed is ether, although the Patentee does not confine himself to the use of that alone. He, however, prefers this spirit for the sake of economy, and the quickness with which it evaporates at a low temperature.

The claim of invention is made to any apparatus for refrigerating fluids, in which a volatile spirit is used, providing such spirit, after it has been evaporated, is condensed, and used again and again without waste. The use of volatile spirit for cooling or freezing, is entirely disclaimed as part of the invention, except under the restrictions and arrangements before mentioned.—[*Inrolled in the Inrolment Office, February,* 1835.]

ORIGINAL COMMUNICATION.

(To the Editor of the London Journal of Arts.)

SIR,—At length I send you a drawing of my improved furnace for steam boilers, &c. Having had it in use in the Bank of Ireland since the year 1821, I can safely recommend it for general adoption.

In Plate IX., A, is the boiler; B, the flues; C, the flame bed; D, the furnace; *e*, *e*, *e*, the oscillating fire bars; F, the dead plate, converted into a coal feeder; G, the hopper, for supplying broken coal; H, the throat; J, J, coal distributors; K, a fixed plate on bottom of hopper; L, a moving plate, for pushing coals through the opening between the bottom of hopper and its throat, that ultimately fall upon the feeding tray; M, a small horizontal shaft, kept revolving five or six times per minute by the steam engine: upon this shaft is fixed an excentric N, which gives a to and fro motion to the moving plate L, by means of two cranks; this motion may be increased or diminished by opening or closing slots in the connecting rods of the moving plate. The excentric N, also causes the fire bars to oscillate to and fro upon their semicircular projecting end pieces, that lie in corresponding hollow recesses of two sleepers fixed on either side of the ash pit. This rocking motion is given by a moving bar O, connected with the excentric by means of the vertical lever pieces P, P. There are ribs or projecting pieces on the side of the moving bar O, that take hold of projecting round pins on the lower or thin edge of each fire bar, which are cast upon one end of all. There is also a snail piece Q, or cam, placed upon the driving shaft close to the excentric: a crank R, with a long and short arm, is fixed on the inside of the ash pit; the long arm is connected to a short lever fixed on the bottom of the feeding tray by means of a connecting rod S: a steelyard arm is affixed to the short arm of the crank R, upon which a weight slides, fixed at any part of it by a tightening screw; this

weight keeps the point of the crank R, always in contact with the snail, so that when this travels round until the point of the crank escapes the step of the snail, the weight will give way, and the end of its bar will strike the check spring T, and cause the feeding tray to fly upwards into a vertical position, discharging its contents uniformly over the entire surface of the fire, as shown by the broken coal flying from it.

This principle is applicable to any furnace, however long or short, by the sliding of weights, &c. &c. The feeding tray has a convenient number of divisions, made by ribs across it.

The properties of this furnace are as follows:—First, it burns less fuel; second, it consumes all gas and smoke; third, there is a considerable reduction of refuse, and but little, if any, dross or clinker, which never can adhere to the fire bars by virtue of their motion; and lastly, the use of the poker, rake, and fire shovel are almost wholly dispensed with; steam is more uniformly generated; and the trouble and stoppages occasioned by flue cleaning, not more than once for every ten times required in ordinary cases.

The refuse of smith's fires, culm, or slack, can be burned with considerable saving and advantage. I may add, that the deterioration of boilers and fire-places is not near so great as in common furnaces. I have had one set of fire bars in constant use five years, and found them in excellent condition to continue them. The reason is obvious. I freely give those improvements to the public, hoping they may prove as useful and satisfactory as they have done to me. I am perfectly willing to give any further information I may have omitted, such communications, of course, to be post-paid.

I am, sir, yours obediently,
JOHN OLDHAM.

Bank of England, 23d May, 1839.

SCIENTIFIC NOTICE.

THE NEW MEANS OF PRODUCING LIGHT FROM VARIOUS HYDROCARBONS.

INVENTED BY MR. BEALE.

In the year 1834, Mr. Joshua Taylor Beale, the author of many ingenious inventions, both chemical and mathematical, patented a lamp for burning the commonest hydrocarbons obtained from coal tar. Though this invention was allowed to possess much merit, and to be useful for many purposes, and had cost its author twenty years in experiments, it was not applicable to general purposes, nor was it without imperfections. The new invention, patented in December, 1837, also by Mr. Beale and others, has no resemblance with the former one, and may fairly be esteemed one of the most interesting and important discoveries of the day.

Beale's first invention consisted in a cup, into which the hydrocarbon flowed from a reservoir, and in which the fluid was lighted by the assistance of a little spirit; and by means of a dome afterwards adjusted, and a supply of atmospheric air under a strong pressure, a blast was supported which kept up a perfect combustion. This lamp has lately been much improved, and will be found of great use in factories, &c., and of great value in the laboratory, both as regards economy and the advantage of powerful heat.

The present system, as will be shown, is not to burn the fluid, but to form it into vapour, in a sort of retort, and to mix that vapour with a sufficient quantity of oxygen from the atmospheric air. It may, therefore, be called the " air and vapour light."

The merits of this invention (the result of protracted perseverance and great expense) are, the production of a brilliant light, at a much less expense than any thing hitherto known, of more intensity, by far, than ordinary gases; consequently, producing more light with less flame, which, in many instances, is a

great advantage, and from substances, one or other universally to be met with at little expense.

The substances from which this light is obtained, are the fluids resulting from the distillation of tar, either vegetable or mineral, and that produced by the coking or destructive distillation coal, resin, turpentine, mineral naphtha, asphaltum, pitch, various bitumens, caoutchouc, animal and other oils, and most of the inflammable bitumens, oleaginous, and resinous substances.

By a very ingenious, and apparently simple, contrivance, the light keeps up the supply of vapour of the hydrocarbon, which being mixed as it is formed, with a sufficient quantity of air, at a proper temperature produces the light. This mixture of oxygen and vapour takes place in the burner, which also answers the purpose of a retort, so that the whole process of making a light similar to gas is performed at once.

This burner is so arranged, as to give, by an easy adjustment, a certain and invariable degree of heat, whereby a regular quantity of vapour is formed; and a proper portion of air being admitted by means of a cock, the combustion is made perfect, and the light, which is, in consequence, quite free from smoke, continues without variation, unless from a very great alteration in the degree of temperature, which would have but a trifling effect, and which can instantly be connected in one or any number of connected lights, either by raising the burner a little further from the fluid, or adding to the pressure of air when the temperature has greatly increased, or by lowering the burner nearer the fluid or lessening the pressure of air, when the temperature has become very materially colder.

The hydrocarbons are contained in a reservoir connected with the burner, and are allowed to flow into it to a given height: an overflow is practised, either in the reservoir or the burner itself, to prevent the possibility of any material rise of the fluid in the burner, which would cause too great a production of vapour, and require a larger quantity of air, or produce smoke, or still more serious consequences; but the overflow can be dispensed with without any possible inconvenience, if the fluid be made to rise

from an under reservoir by the various means known and practised in oil lamps, &c. The air is introduced by means of a small tube, which passes through the fluid in the burner, and is thus forced up an inverted tube fixed to the top, to receive a certain degree of heat, and then return down upon the fluid to mix with the vapour, and afterwards to escape for combustion.

The air is supplied to the different lights in the establishment by means of pipes, in the same way as gas, through which it is forced from a reservoir or feeder under a pressure of about half an ounce to the inch; or when the lamps are made portable, the self-acting air feeder can be placed in the bottom of the lamp, or compressed air used with proper arrangement.

Models of all these lamps are now making, under the direction of Mr. Du Maurier, to be submitted to every scientific body in Europe, America, &c. &c.

List of Patents

Granted by the French Government from the 1st of April to the 30th June, 1838.

(Continued from page 131.)

PATENTS FOR FIFTEEN YEARS.

To Willian Gossage, of Stoke-Prior, represented in Paris by Mr. Perpigna, Advocate of the French and Foreign Office for Patents, Rue de Choiseul, for a new construction of machine to obtain mechanical force by means of steam or any other elastic fluid, or even by the pressure of water; and the application of the said machines, with proper modifications, to propel and raise fluids.

— Celestin Joseph Delfosse and Nicolas Joseph Savoye, of Berlaimout, represented by Mr. Perpigna, for an improved dibbling machine, distributing seeds of every kind in straight lines, sowing close or far apart, capable of sowing beans, peas, and the like vegetables.

To Auguste Hoheberger, of Burgan, in Bavaria, represented in Paris by Mr. Perpigna, for a kind of machine for making, with the paper pulp, pasteboard boxes of all kinds and dimensions.

— James Gowland, of London, represented in Paris by Mr. Perpigna, for improvements in watches and chronometers.

— David Stewenson, of London, represented in Paris by Mr. Perpigna, for an improved and economical fuel.

— Jean Baptiste Hautin, of Lyons, represented in Paris by Mr. Perpigna, for a metallic endless cloth, to be used in the making of paper.

— Messrs. Contaux, sen., and Co., of Molsheim, represented in Paris by Mr. Perpigna, for improvements in the construction of coffee-mills.

— Noel Jarry and Benjamin Philippe, of Paris, for a new apparatus called *via mobilis*, adapted to all kinds of carriages, and to be used instead of fixed railroads.

— Reillonas, Brothers, and Co., of Dijon, for an improved method of refining iron by means of charcoal.

— Stanislas Sorel and Hector Ledru, of Paris, for a galvanic paint to preserve copper, and prevent the formation of verdigrise on its surface.

— Charles Victor Beslay and Pierre Isidore Rouen, of Paris, for a new process and apparatus applicable to the making and the using of carbonated hydrogen gas employed for lighting.

— Elie Paris, of Paris, for improvements in the construction of railroads, and also in paving, pitching, &c.

List of Patents

Granted in Scotland between 22d April and 22d May, 1839.

To John Hillard, in consequence of a communication made to him by a foreigner residing abroad, for certain improvements in machinery or apparatus for making or manufacturing screws. —24th April.

To James Nasmyth, of Patricroft, near Manchester, for certain improvements applicable to the bearings or journals of locomotive and other steam engines; which improvements are also applicable to the bearings or journals of machinery in general. —24th April.

— George Price, of Cornhill, London, in consequence of a foreign communication, for improvements in filtering and clarifying water and other liquids.—30th April.

— William Pontifex, of Shoe-lane, London, for improvements in apparatus or materials employed in filtering and clarifying water and other liquids.—30th April.

— James Smith, of Deanston, Kilmardock, Perthshire, for improvements in the machinery for spinning and twisting of wool, and other similar fibrous substances.—30th April.

— Thomas Barnabas Daft, of Regent-street, London, for certain improvements in inkstands, and in materials and apparatus for fastening and sealing letters.—30th April.

— Elisha Haydon Collier, late of Boston, in the United States of North America, but now of Globe Dock Factory, Rotherhithe, for improved machinery for manufacturing nails.—30th April.

— Matthew Heath, of Furnival's-inn, London, in consequence of a foreign communication, for improvements in clarifying and filtering water, beer, and other liquids.—30th April.

— James Whitelaw, of Glasgow, for an improved rotatory machine, to be worked by the pressure and reaction of a column of water, which machine may be used as a steam engine; also an improved water meter, and a machine for raising water or other liquid by its centrifugal force.—17th May.

— William Watson, of Temple-street, Dublin, for an improvement on the construction of ships; and which improvement is also applicable to all kinds of sea-going vessels: and also, certain improvements in the construction of boats and other vessels intended to be used in canals and inland navigation.—20th May.

New Patents
SEALED IN ENGLAND.
1839.

To John Jones, of Westfield-place, Sheffield, for a new frying and grilling pan for the cooking of steaks and other meats.—Sealed 25th April—6 months for inrolment.

To John Boyd, of College-street, and Hugh Francis Rennie, of Glengall-street, Belfast, flax-spinners, for certain improvements upon the spinning frame used for spinning flax, hemp, and tow upon the wet principle.—Sealed 30th April—6 months for inrolment.

To Julian Skrine, of Cambridge, Esq., for improvements in manufacturing forks and spoons, coins and medals.—Sealed 30th April—6 months for inrolment.

To James Smith, of Deanston Works, Kilmardock, cotton-spinner, for certain improvements in the machinery for spinning and twisting of wool and other similar fibrous substances.—Sealed 30th April—6 months for inrolment.

To John Rostron, of Edenfield, Lancaster, manufacturer, for certain improvements in the construction of looms for weaving.—Sealed 30th April—6 months for inrolment.

To Joseph Hunt, of Dalston-terrace, Middlesex, gentleman, for improvements in the manufacture of soda and other valuable products from common salt.—Sealed 7th May—6 months for inrolment.

To David Naylor, of Copley Mill, Halifax, manufacturer, and John Crighton, jun., of Manchester, machine-maker, for certain improvements in machinery for weaving single, double, and treble cloths by hand or power.—Sealed 7th May—6 months for inrolment.

To George England, of Gloucester-terrace, Vauxhall-

bridge-road, engineer, for an improved screw jack for raising or moving heavy bodies, both vertically and laterally.—Sealed 7th May—6 months for inrolment.

To William Davis, of Leeds, machine-maker, and George Kinder, of Aldmondsbury, cloth-dresser, for certain improvements in machinery for dressing and cleansing woollen cloths.—Sealed 7th May—6 months for inrolment.

To Joseph Maudslay and Joshua Field, of Lambeth, engineers, for improvements in the construction of marine steam engines, which is particularly applicable to steam engines of the largest class.—Sealed 7th May—6 months for inrolment.

To James Whitelaw, of Glasgow, for an improved rotary machine, to be worked by the pressure and reaction of a column of water, which machine may be used as a steam engine; also an improved water meter, and a machine for raising water or other liquid by its centrifugal force.—Sealed 7th May—6 months for inrolment.

To Edward Oliver Manby, of Swansea, civil engineer, for a new method of manufacturing gas for the general purposes of illumination.—Sealed 8th May—6 months for inrolment.

To Germain Le Normand De l'Osier, of the Tavistock-hotel, Covent-garden, merchant, for improvements in machinery for raising water.—Sealed 8th May—6 months for inrolment.

To Richard Prosser, of Birmingham, civil engineer, for certain improvements in machinery for making nails and screws.—Sealed 8th May—2 months for inrolment.

To William Harper, of Cooper's-court, Cornhill, patent stove manufacturer, and Thomas Walker, of Birmingham, machinist, for improvements in stoves and grates.—Sealed 10th May—6 months for inrolment.

To George Stocker, of Birmingham, Warwick, brass-

founder, for certain improvements in cocks or apparatus for drawing off liquids.—Sealed 13th May—6 months for inrolment.

To Moses Poole, of Lincoln's-inn, gentleman, for improvements in reducing the friction of axletrees and axletree-boxes, and other such moving parts of machinery.—Sealed 13th May—6 months for inrolment.

To John Henry Rodgers, of Birmingham, merchant, for improvements in clasps or fastenings and connecting pieces, principally applicable to certain articles of dress. —Sealed 13th May—6 months for inrolment.

To John Williamson Whittaker, of Bolton, joiner, and Rowland Hall, Heaton, of the same place, cotton spinner, for certain improvements in the means of connecting or uniting straps or bands for driving machinery and other similar purposes, and in the apparatus for effecting the same.—Sealed 20th May—6 months for inrolment.

To John George Rodmer, of Manchester, engineer, for certain improvements in machinery, tools, or apparatus for cutting, planeing, turning, drilling, and rolling metal and other substances.—Sealed 20th May—6 months for inrolment.

To John Walker, of Allen-street, Surrey, oven builder, for certain improvements in coke ovens.—Sealed 22d May —6 months for inrolment.

To James Vardy, of Wolverhampton, gentleman, for improvements in rolling iron.—Sealed 22d May—6 months for inrolment.

To William Jefferies, of Holme-street, Mile-end, metal refiner, for certain improvements in the process of smelting or extracting metal from copper and other ores.—Sealed 22d May—6 months for inrolment.

To Thomas Harper, of the Grange, near Newnham, Gloucester, merchant, for certain improvements in railways or tram roads.—Sealed 22d May—6 months for inrolment.

To Nicholas Troughton, of Leicester-street, Regent-street, gentleman, for improvements in obtaining copper ores.—Sealed 22d May—6 months for inrolment.

To Nicholas Troughton, of Swansea, Glamorgan, for improvements in the manufacture of zinc.—Sealed 22d May—6 months for inrolment.

To Henry Griffiths, of Acton-place, Camden-town, Middlesex, artist, for improvements in the process of producing prints or impressions from steel, copper, and other plates.—Sealed 25th May—6 months for inrolment.

To Martial Augustin Joseph de Herrypon, of Leicester-street, St. Martin-in-the-Fields, mining engineer, for an improved machine or apparatus for washing and bleaching wool, cotton, silk, linen, and other fibrous materials, either in a manufactured or unmanufactured state.—Sealed 25th May—6 months for inrolment.

To Thomas Clark and Charles Clark, of Wolverhampton, ironfounders and co-partners, for an invention for glazing and enamelling cast iron, hollow ware, and other metallic substances.—Sealed 25th May—6 months for inrolment.

To Benjamin Hick, of Bolton, in the county of Lancaster, engineer, for certain improvements in machinery or apparatus for dyeing cotton, woollen, and other fabrics, and other fibrous substances or materials.—Sealed 25th May—6 months for inrolment.

CELESTIAL PHENOMENA, FOR JUNE, 1839.

D.	H.	M.	
1			Clock after the sun, 2m. 38s.
—			☽ rises morn.
—			☽ passes mer. 3h. 4m. M.
—			☽ sets 6h. 42m. M.
4			Gambart's Comet R. A. 3h. 46m. dec. 22. 38. N.
			Ditto passes mer. 22h. 56m.
	11	37	☽ in □ or last quarter.
	12	21	♃'s first satt. will em.
	16	39	♅ in conj. with the ☽ diff. of dec. 0. 24. S.
5			Clock after the sun, 2m. 0s.
—			☽ rises 0h. 49m. M.
—			☽ passes mer. 6h. 22m. M.
—			☽ sets 0h. 12m. M.
6	2	54	♃ stationary.
7	9	11	♅ in □ with the sun.
8			Gambart's Comet R. A. 4h. 4m. dec. 22. 59. N.
			Ditto passes mer. 22h. 57m.
9	2		☽ in Perigee.
	21	16	☿ in conj. with the ☽ diff. of dec. 6. 36. S.
10			Clock after the sun, 1m. 5s.
—			☽ rises 2h. 12m. M.
—			☽ passes mer. 10h. 46m. M.
—			☽ sets 7h. 42m. A.
11	2	42	Ecliptic conj. or ● new moon.
12			Gambart's Comet R. A. 4h. 22m. dec. 23. 13. N.
			Ditto passes mer. 23h. 0m.
	8	49	♀ in conj. with Vesta.
14			Mercury R. A. 4h. 25m. dec. 20. 42. N.
—			Venus R. A. 10h. 33m. dec. 9. 56. N.
—			Mars R. A. 11h. 40m. dec. 2. 40. N.
—			Vesta R. A. 8h. 21m. dec. 22. 44. N.
—			Juno R. A. 0h. 15m. dec. 4. 24. N.
—			Pallas R. A. 12h. 54m. dec. 24. 46. N.
—			Ceres R. A. 12h. 56m. dec. 4. 37. N.
—			Jupiter R. A. 12h. 31m. dec. 2. 15. S.
—			Saturn R. A. 16h. 17m. dec. 19. 23. S.
—			Georg. R. A. 23h. 11m. dec. 6. 5. S.
14	—		Mercury passes mer. 23h. 0m.
	—		Venus passes mer. 2h. 58m.
	—		Mars passes mer. 6h. 11m.
	—		Jupiter passes mer. 7h. 5m.
	—		Saturn passes mer. 10h. 47m.
	4	7	♀ in conj. with the ☽ diff. of dec. 1. 35. S.
15			Clock after the sun, 0m. 4s.
	—		☽ rises 7h. 42m. A.
	—		☽ passes mer. 3h. 45m. A.
	—		☽ sets 11h. 28m. A.
16			Gambart's Comet R. A. 4h. 40m. dec. 23. 20. N.
			Ditto passes mer. 23h. 3m.
17	3	35	♂ in □ with the sun.
18	9	41	♂ in conj. with the ☽ diff. of dec. 1. 12. N.
	10	1	☽ in □ or first quarter.
19	3	14	☿ in the ascending node.
	13	15	♃ in conj. with the ☽ diff. of dec. 3. 25. N.
20			Gambart's Comet R. A. 5h. 0m. dec. 23. 18. N.
			Ditto passes mer. 23h. 6m.
			Clock before the sun, 1m. 1s.
	—		☽ rises 1h. 52m. A.
	—		☽ passes mer. 7h. 14m. A.
	—		☽ sets 0h. 13m. M.
	10	5	♃'s second satt. will em.
	10	39	♃'s first satt. will em.
21			☽ in Apogee.
	12		♅ stationary.
	16		☉ enters Cancer, Summer commences.
23			Pallas in conj. with Ceres, diff. of dec. 17. 37. N.
	16	45	☿ in Perihelion.
24			Gambart's Comet R. A. 5h. 19m. dec. 23. 7. N.
			Ditto passes mer. 23h. 10m.
	5	48	♄ in conj. with the ☽ diff. of dec. 6. 55. N.
25			Clock before the sun, 2m. 5s.
	—		☽ rises 7h. 53m. A.
	—		☽ passes mer. 11h. 8m. A.
	—		☽ sets 1h. 40m. M.
26	12		Ecliptic oppo. or ○ full moon.
	21	47	☿ in sup. conj. with the sun.
27	10	20	♃'s third satt. will im.
28			Gambart's Comet R. A. 5h. 39m. dec. 22. 46. N.
			Ditto passes mer. 23h. 14m.
	1	59	Pallas in □ with the sun.

J. LEWTHWAITE, Rotherhithe.

THE

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No. LXXXVIII.

Recent Patents.

To WILLIAM EDWARD NEWTON, *of the Office for Patents, Chancery-lane, in the county of Middlesex, patent-agent, for improvements in the construction of bridges, viaducts, piers, roofs, truss-girders and stays, for architectural purposes, being a communication from a foreigner residing abroad.*—[Sealed 17th October, 1838.]

THESE improvements in the construction of bridges, viaducts, piers, roofs, truss-girders and stays for architectural purposes, were communicated to me by the inventor, George Lewis Frederick Laves, Knight of the Royal Hanoverian Guelphic Order, architect to the King of Hanover, and residing in that kingdom, in whom all right, title, and interest in the said patent is now vested.

The objects of the invention are, the construction of trussed beams on a principle of trussed girder, applicable to the various purposes above-mentioned, which, from their

peculiar conformation, will possess very great strength and firmness, considering the comparatively small quantity or weight of materials of which they are constituted; and the adaptation of such peculiar constructions of trussed beams to the erection of bridges, viaducts, piers, roofs, and other uses, by the employment of which the necessity of providing buttresses or lateral bearings at the ends to resist the lateral pressure of an arch, or of secure holdfasts in the banks or piers to sustain the tension of a chain, is superseded, and the structure enabled to rest securely, by its gravity or downward pressure, upon piers, piles, or other perpendicular supports.

The invention which I claim under the above in part recited Letters Patent, consists in the peculiar construction of trussed beams, and their adaptation to the above purposes; which beams are formed by the union of opposing bows conjoined at their ends, and kept asunder by stretchers, or held together by tension rods. The effect produced by these constructions of trussed beams, as applied for the erection of bridges, &c. is, that whatever force or pressure may be exerted upon the belly of the one bow will, owing to the junctions of their ends, tend to bring both bows into a straight line; but, by the resistance of the stretchers, they will be mutually supported or kept asunder, and the tendency of the one bow or edge of the beam to expand by the force of the stretchers outward, be counteracted by the tendency of the other bow or edge of the beam to contract by their pull inward: or when pressure is applied to the ends of such trussed beams, the bows will be held together by the tension rods. In this way are produced light, but firm, trussed beams, which will be found to be extremely strong and rigid, considering the small amount of iron, or wood, or other materials of which they may be composed.

The principles on which these trussed beams are formed, it will be perceived, embrace a means of neutralizing the effects of weight or pressure exerted in compressing in one direction, and expanding in the other, the materials of which the beam is constituted.

In the erection of an arch of stone, or brick, or other material combined, as in fig. 1, Plate X., the weight or pressure exerted on the top of the arch *a, a,* supported laterally by the buttresses *b, b,* would have a tendency to compress the stone or other materials into a smaller compass, and to bring the arch into a straight line. In the bridge fig. 2, constructed on the suspension principle, by a chain *a, a,* made fast at its ends into the banks *b, b,* and supported by the pillars *c, c,* the whole of the structure is carried by the chains hung in catenarian curves, and the tendency of the superincumbent weight would be to draw the ends of the chain from their fastenings at *b, b,* or to extend the material of which the catenarian curve is formed, and thereby to bring down the chain.

In the former of these erections very considerable buttresses must be provided for the lateral supports of the arch; and in the latter a great impediment frequently arises from the difficulty of being able to obtain secure fastenings to sustain the tension.

Fig. 3, represents a bridge constructed upon the improved plan, formed by a trussed beam placed horizontally, the resistance of all the parts of which exists within itself, by the combination of the two powers contained in materials, viz., that of resistance to compression and resistance to extension. The upper part of the beam *a, b, c, d, e, f, g,* represents the arch, as described in the first figure; and the lower part *a, h, i, k, l, m, g,* the chain, as in the second figure. By joining the ends of these together at *a,* and *g,* and introducing the intermediate supports *n, o, p, q, r,* a

truss-beam is formed, in which the two forces tending to compress in the first instance, and extend in the second, are entirely neutralized, consequently the whole structure will bear upon the banks *s*, *t*, simply with a perpendicular pressure. In this construction, diagonal braces may also be introduced in various directions, to give firmness and prevent vibration.

Figs. 4, 5, 6, 7, and 8, show various modifications in the construction of trussed beams, which may be applied to the purposes of perpendicular or diagonal supports, stays, and braces. Fig. 4, represents, in different positions, two pieces of wood or iron joined at their ends by bolts or bands of iron, and propped in several places to keep the bows open. Fig. 5, is a similar arrangement of wood or iron formed in three bows. Figs. 6, and 7, the same principle of trussed beams, formed of wood or iron in four or five bows; and, indeed, the principle may be extended to any number of bows. Fig. 8, shows a solid bar of iron, tapered towards its ends, illustrating the same view, viz., that of economizing material, and yet retaining strength.

Figs. 9, 10, 11, 12, 13, and 14, represent the elevations, floors, and sections of bridges formed with two or three truss beams or girders, as explained in fig. 3. The number of the beams or girders may be increased, and placed side by side, according to the strength required. The elevation or open sides of the beams or girders may be decorated with ornamental crosses, circles, or other forms at pleasure, provided sufficient perpendicular stays are retained.

Figs. 15, 16, 17, and 18, represent the elevation, plan, and transverse sections of a bridge of large span. To enable the arch *a*, *b*, *c*, *d*, *e*, to resist any pressure without increasing the weight too much, it may be constructed of hollow cylinders of cast iron, united at the points *b*, *c*, *d*, &c., with wrought iron bands, bolts, or screws; and the perpendi-

cular and diagonal stays may be constructed as explained in figs. 4, to 7.

Fig. 19, represents the mode of connecting the hollow rods and chains at their end junctions. Fig. 20, shows the mode of connecting two joined pieces of the hollow rod with a perpendicular and two diagonal stays, supported by part of the chain.

The dimensions of the rods and braces must depend upon the purpose for which they are to be applied, and the magnitude of the erection required, which can only be ascertained by calculating the strength of material in the way usually done in such cases, and proportioning them to the required force of resistance.

These principles may be applied to the erection of wooden bridges, which, in some situations, may be more convenient and less expensive than iron ones. It is, however, to be particularly observed, that the wood of which such trussed beams are constructed must be perfectly sound throughout.

The most simple mode of forming the trussed beam in wood, is shown in figs. 21, and 22. In producing the trussed beam shown at fig. 22, I first take a straight solid beam of timber, as *a*, *b*, fig. 21, and cut or slit it through the middle by means of a circular saw, or otherwise, in the longitudinal line from *c*, to *d*, leaving the ends *a*, to *c*, and *d*, to *b*, uncut; I then bolt or bind round the ends firmly with iron at *l*, and *m*, fig. 22, and force open the middle part of the slit by introducing wedges, blocks, or stretchers at *e*, *f*; *g*, *h*; and *i*, *k*, and in other places if necessary, according to the length of the beam. In this way a wooden trussed beam is produced on the same principle of the double bow, as before described in iron. Fig. 23, shows the end of the beam upon an enlarged scale: fig. 24, represents the same construction of trussed beam made in two

pieces, joined together in the middle of each bow, the upper bow by rebates firmly bolted together, the lower bow by dovetail notches, held by corresponding union blocks securely braced. Fig. 25, shows a similar construction, formed by the junctions of several pieces; and fig. 26, may represent a transverse section of either of the two last described trussed beams. In case that a beam of sufficient substance, to be cut open as above, cannot be obtained, the ends of the two beams may be connected and secured as shown at fig. 27; and fig. 28, shows the end of the same upon a larger scale, secured by bolts or bands.

Figs. 29, 30, and 31, exhibit the elevation, plan, and transverse section of a large bridge of wood complete, constructed on the above principle, by the junction at *a*, and *b*, of three lengths of timber in each bow; the diagonal braces may be formed by trussed beams if required, made on the above principle. Figs. 32, and 33, show the mode of forming the junctions. The proportionate substances of the parts suited to the required strength can only be known by calculating the resistance and tenacity of the fibres of the particular kind of wood employed.

Bridges for temporary use, for military purposes, or for gardens, may be constructed by combining rough arms of trees, as shown at fig. 34, which is a longitudinal elevation; and fig. 35, a transverse section of the same: *a*, *b*, *c*, and *d*, *a*, *c*, represent two rough forked arms of trees connected in the middle in the way before described; and for temporary use, the stretchers and braces may be attached by lashing ropes round at the junctions. Fig. 36, shows one end of this bridge upon a larger scale. It is surprising with what ease and expedition a strong bridge may be constructed in this way, for the passage of troops or any other purpose.

These principles of construction, either in iron or wood,

admits of considerable tasteful ornament and elegance of structure. Fig. 37, is an elevation, and fig. 38, a plan of a bridge consisting of a series of trussed beams joined end to end, and supported upon perpendicular pillars, piers, or piles. If the banks of the river are sufficiently high to leave room under the bows for the passage of boats at high water, the floor of the bridge may be laid in a horizontal line, or a slight elevation may be given to the two ends, and the remainder placed horizontally. As the whole of the weight of these constructions of bridges press perpendicularly, and are comparatively very light, very small pillars will be sufficient to support them; and these may be constructed by combining several poles and binding them together, and enclosing them within cast iron cylinders.

Fig. 39, represents a bridge formed by only one span of trussed beam; fig. 40, is the plan of the same. This bridge is raised upon very high piers for the purpose of allowing vessels to pass under it. In the plan is shown the circuitous road and steps for ascending and descending.

Fig. 41, is an elevation, and fig. 42, a plan of a bridge having an opening or drawbridge in the middle, for the passage of a tall vessel or ship; and figs. 43, and 44, represent in plan, other arrangements for the construction of drawbridges at the ends. All these bridges are constructed upon the truss-beam principle just set out, and, therefore, do not require any further explanation, as the details of their construction may be varied according to taste and circumstances.

A similar construction of trussed beam may be applied for supporting a roof which is required to be nearly flat, or for carrying a floor. Figs. 45, 46, and 47, exhibit different modes of applying these principles or trussed beam. For higher roofs, the perpendicular stays may be prolonged, as shown at fig. 45; or several trussed beams may be com-

bined, as at fig. 46. Floors of extensive span may be likewise supported solely upon the end bearings, and will be found to be extremely firm.

The same principles may be applied to the construction of light ladders, particularly for fire-escapes, as shown at figs. 48, and 49; and which may also be occasionally employed as bridges to pass from one house to another across a street, or for scaling walls; and might be readily made in parts, for the convenience of being transported from place to place, and quickly put together when occasion should require.—[*Inrolled in the Rolls Chapel Office, April,* 1839.]

Specification drawn by Messrs. Newton and Berry.

To Alexander Southwood Stocker *and* Clement Heeley, *of Birmingham, manufacturers, for their invention of improvements in straps for wearing apparel.*—[Sealed 10th September, 1838.]

This invention relates to modes of making straps by combining plates of metal with leather, or cloth, or other fabric, in such manner that the joints or connexions shall be flexible, and, in some cases, capable of ready separation. And secondly, our invention relates to other modes of constructing straps; and in order to give the fullest information in our power, we will proceed to explain the drawing hereunto annexed. We would, however, first remark, that we are aware that straps for holding down garments have been before made by combining metal plates with side-pieces of leather, cloth, or other fabrics; but, in such cases, they have been made by permanently and immoveably fixing of the plates of metal to the leather, cloth, or other

fabrics. Our invention does not, therefore, relate to joining plates of metal generally to side-pieces of leather, cloth, or other suitable fabric, but only relates to such cases where the side-pieces of leather, or cloth, or other fabrics are connected with plates of metal by moveable or flexible joints; whereby greater convenience of applying such straps to retain down trousers or other parts of garments is obtained. And further, such straps will be found more agreeable when used or worn, than any metal straps heretofore made and used.

Figs. 1, and 2, Plate XII., show a plan and edge view of one construction of strap made according to our invention: *a, a,* are the two side-pieces of leather, cloth, or other suitable fabric, which are applied to the trousers or other garment; *b, b,* are two plates of metal, which are bent over in such a manner as to embrace the rings *c, c*; and the plates *b,* are fastened to the side-pieces *a,* by rivets, as is clearly shown, or they may be fastened by other means; *d,* is the plate of metal which comes under the foot, the ends being turned over in such manner as to embrace the rings *c, c*: by this means a strong, yet flexible, strap is produced, as will be readily understood by examining figs. 1, and 2, of the drawing; and it will be seen that there is a slot cut in the plate *d,* the object of which is to keep the strap correctly in its place, by having a screw in the boot or shoe, and in such manner that the head will pass through the larger part of the slot; and when the strap is brought to a central position, the head of the screw will prevent the strap coming off; and the side-pieces *a, a,* being fast to the trousers or other garment, would prevent the strap coming into such a position as to allow of the larger part of the slot at *e,* coming opposite the head of the screw. Instead of the plate *d,* a metal wire may be used, as shown in fig. 16.

Figs. 3, and 4, show a plan and end view of another ar-

rangement of strap, differing in some particulars from that above described; but is substantially the same so far as the movement or flexibility obtained in the joining or connecting of the side-pieces *a*, *a*, and the metal plate *d*; in the present case the rings *c*, are dispensed with, and the plates *b*, *b*, pass through slits or openings formed in the plate *d*, all of which are clearly shown in the drawing.

Fig. 5, shows another arrangement of strap, which differs from those above described, but has, like them, the same principle of combination, inasmuch as the flexibility of the joining or connecting of the plate *d*, and the side-pieces *a*, *a*, is concerned: in this case the joints between the parts *b*, and the plate *d*, are hinge joints, as is clearly shown; and the plate *d*, consists of one long plate, with parts cut out to form the joints, and the ends of the plates *d*, are folded down and riveted in the middle, as is clearly shown in the drawing.

Figs. 6, 7, 8, and 9, show another arrangement of strap similar in most respects to that described at figs. 1, and 2; but in this instance the parts of the strap are not affixed permanently together, but are readily attached one to the other, and the plate *d*, is affixed to the under part of the boot or shoe, and the ends are turned over to form hooks; and it is desirable that the plate *d*, should be of steel or of other metal which would have some elasticity, to cause it to press closely on the under side of the shoe or boot, as is shown; the rings *c*, are applied by forcing them between the sole and the ends of the plate *d*, by which, when once they are applied, they will not come out by the act of wearing them, but may be readily removed by hand.

Figs. 10, and 11, show a side-piece *a*, in order to explain how a spring may be applied in order to obtain elasticity lengthwise of the strap; in this case, in place of the plates *b*, being fixed to the side-pieces *a*, they are made suitable

to pass into a case, and have coiled springs applied, which will allow of the elongation of the strap when drawn on, but will readily be contracted again by the springs, all which will readily be traced in these figures of the drawing.

Thus far it will be seen that although the straps each vary in some particulars in the detail of their construction, they all have one principle of action, that of movement and flexibility to the joining or connecting of the side-pieces *a*, with the plates *d*. And we would remark, that it will be evident that other means may be resorted to for affixing the parts *b*, to the parts *a*, *d*, so long as a similar flexibility is obtained; and the parts may be differently shaped without departing from the invention, as above described. And we would remark that we generally make the side-pieces *a*, of leather, and the parts *b*, *c*, *d*, of brass or iron; but other materials and metals may be used.

Another part of our invention is shown at figs. 12, and 13, and consists in applying metal hooks, with enlarged barbs or ends, to the side-pieces *a*, as is shown; and to the boot or shoe we apply a bent plate *g*, with a slot cut therein, having an enlarged opening at *h*, into which the barb or enlarged end of the hooks can enter, and then be slided in the narrower part of the slot, and there be held securely, as will readily be understood by examining the drawing at figs. 12, and 13.

Another part of our invention is shown at figs. 14, and 15, where two plates *i*, *i*, are affixed to the side-pieces *a*, *a*; each of them having a slot cut or formed therein; and there is to be a screw in the under part of the boot or shoe, the head of which will readily pass through the enlarged parts of the slots, but will not pass through the narrower parts thereof; hence, when once the plates *i*, are applied, they will be held securely when being worn.—[*Inrolled in the Inrolment Office, February*, 1838.]

To William Bates, *of Leicester, fuller and dresser, for his invention of improvements in the process of finishing hosiery and other goods manufactured from lamb's wool, Angola, and worsted yarns.*—[Sealed 8th March, 1836.]

This invention consists in submitting hosiery and similar goods made of elastic stocking fabric, and known by the names of lamb's wool, worsted, and Angola, to the finishing process of a press heated by steam, hot water, or other fluid, in the manner hereinafter mentioned, whereby the surface is laid smooth and the colour brightened, and have a far superior finish to the ironing or other process to which such goods have heretofore been submitted.

Fig. 1, Plate XI., is a plan of a cast iron frame *i*, through which passes the steam pipe *c*, and the rammer of the hydraulic press *f*, *f*, are iron columns for supporting the steam box *a*. Fig. 2, plan of the steam box *b*, showing the surface on which the goods are placed for the purpose of pressing them; fig. 3, *a*, is the section of a box of cast iron, filled with steam from a pipe *c*, connected with a boiler; *b*, is a similar box, filled with steam from a pipe *d*, which works into a stuffing box *e*, rendered steam-tight by packing, and communicating with a branch pipe from *c*, thus allowing the lower box *b*, to fall, for the introduction of goods between the two heated surfaces: *f*, *f*, iron columns, firmly fixed to the under side of the steam box *a*, for the support of the same; *h*, is the rammer of the press, secured to the under side of the steam box *b*; *g*, *g*, are taps to try the state of the steam. Fig. 4, an hydraulic pump; A, is a pipe of communication. Any number of steam boxes may be attached as may be found convenient to be worked by the same pump. The machine may be worked either by hydraulic power or by a screw.

Having thus described the description of the press I

prefer for the purpose of my invention, I would remark, that it will be evident that in place of the pressure being obtained by hydraulic means, the hot boxes may be pressed together, with the goods between them, by a screw or screws, or by other well-known means; and in place of steam, hot water or other fluid may be caused to circulate in such boxes: and it will be desirable further to remark, that I use steam of twelve pounds pressure on the square inch.

I will now proceed to describe the process of applying the hot boxes to the purposes of my invention; and I will explain the same as being performed on stockings, the only difference in applying the process to other goods made of a like description of fabric, consists in the shape or form put into the goods. Supposing the process is to be performed on lamb's wool or on worsted stockings, I place each (inside out, and in a dry state) on a leg or shape of wood, or other suitable material, about a quarter of an inch thick; a number of stockings thus prepared, I place between the hot boxes in a single layer; I then cause the boxes to press the same between them for some minutes. Three minutes will generally be found sufficient. If Angola goods are to be submitted to the hot-pressing process, they are to be put on to the legs or shapes in a damp state; in other respects the process is the same as that above described for lamb's wool and worsted.

Having thus described the nature of my invention, and the manner of performing the same, I would remark, that I am aware that clothes made of wool, but woven with warp and weft, have been heretofore pressed by boxes or surfaces heated by steam or water; and I am also aware that stockings and other goods made of a similar elastic or looped fabric, have been placed between plates of iron heated by fires or ovens; I do not, therefore, claim the

finishing of such goods by heat generally, but what I do claim, is the submitting hosiery and similar goods made of elastic stocking fabric to the pressure of hot boxes or surfaces heated by steam, water, or other fluid, as above described.—[*Inrolled in the Inrolment Office, September*, 1836.]

To John Isaac Hawkins, *of Chase-cottage, Pancras-vale, in the Hampstead-road, in the county of Middlesex, engineer, for an improvement in the art of manufacturing iron and steel, being a communication from a foreigner residing abroad.*—[Sealed 4th July, 1836.]

These improvements consist, firstly, in taking the ore of iron in the roasted state, after the volatile parts have been expelled by heat in the usual way, in which state it is technically called "burnt mine," and subjecting it to the chemical process known by the name of cementation, according to, and in imitation of, certain testing samples to be obtained as hereinafter particularly described; in which process of cementation the roasted ore is placed in contact with, and surrounded by, charcoal or other substances containing a sufficient quantity of carbon, in a closed vessel or chamber, so as to exclude the atmosphere, while as high a degree of heat is applied as the material will bear without being melted; by which cementation a new product is obtained, which may, by simple, speedy, common and well-known processes, be converted into cast iron, cast steel, or into malleable steel or malleable iron.

And, secondly, in forming a series of testing samples according to which the cementation may be conducted, in order to the production of iron or steel of the texture or quality of any one of the samples chosen.

Before describing the manner of carrying the said im-

provement into effect, I will remark that the results of the cementation will be affected by at least seventeen distinct circumstances, all of which ought to be carefully attended to, namely:—

1. The natural quality of the ore.

2. The perfection or imperfection of the roasting.

3. The sizes into which the lumps of ore are broken for cementation.

4. The porousness or compactness of the ore.

5. The quantity cemented in one vessel.

6. The internal dimensions of the cementing vessels, and thickness of their bottoms and sides.

7. The setting of the furnaces for beneficially applying the heat to the cementing vessels.

8. The substance from which the charcoal is burnt, as bone or other animal matters, hard wood or soft wood, or other substances.

9. The perfection or imperfection of the burning of the charcoal.

10. The freshness or staleness, dampness or dryness of the charcoal.

11. The degree of pulverization of the charcoal.

12. The quantity of charcoal employed.

13. The careful mixture of the lumps of ore with the charcoal in the cementing vessel.

14. The time of getting up the fire.

15. The time of continuing the full heat.

16. The degree of heat applied.

17. The time of lowering the heat after the fire is extinguished.

From a careful consideration of all these points, it will be obvious that it is impracticable to give any fixed proportions of the ore, of the charcoal, and of the duration of the heat, that shall produce the same results from all

varieties of the ore, and under all conditions of working. I am, therefore, compelled, by the nature of the invention, to describe certain experimental tests by which persons, skilled in the manufacture of iron and steel, can ascertain the required proportions and treatment for any given quality of roasted ore, in order to their producing the requisite qualities of cemented ores from which they may manufacture cast iron, cast or malleable steel, or malleable iron at pleasure, according to the samples determined on. And I would further remark, that in the process of cementation I make use of two methods.

In my first method I take coarsely pulverized charcoal in sufficient quantity to envelope, as much as practicable, every lump of roasted ore, which should be broken into pieces not exceeding three or four pounds weight; and I continue the heat a greater or lesser time, in order that the ore may obtain its due proportion of carbon, according as I wish to have a product suitable for being manufactured into cast iron, into cast or malleable steel, or into malleable iron.

In my second method I take an ascertained proportion of finely pulverised charcoal and of roasted ore, in lumps not exceeding two or three ounces in weight, and pack them, carefully mixed together, in the cementing vessel, and continue the heat until the whole of the charcoal has operated and exhausted its powers in producing the required degree of cementation, after which point the further continuance of the heat will be comparatively of little consequence.

In working on a small scale, and employing very careful assistants, the second method might yield a superior product to the first method; but on a large scale, and where only common labourers are to be obtained, I propose the first method, because the superintendents can more easily control the time of firing and the degree of heat than they

could the careful weighing and packing required in the second method.

In proceeding, then, to obtain a series of testing samples, as guides in carrying the said improvement into effect upon any given quality of ore, according to the first method, I take about four hundred pounds weight of "burnt mine," of an average quality of that intended to be worked, and I break it into lumps, generally of about three or four pounds weight, intermixed with such smaller pieces as fly off in the endeavour to produce the larger sizes; and I divide the whole quantity into twenty portions of about twenty pounds each, and put each portion into a strong cast iron pot or a crucible, surrounding the lumps with coarsely pounded charcoal, without regard to proportion, but of such an average quality as can be regularly supplied to the works; and I cover the upper layer of ore in each pot with at least half an inch depth of charcoal, and over that I put a layer of an inch or two of sand; and, to prevent the sand being disturbed in the fire, I place a tile or a metal lid over the sand.

Thus prepared, I put the pots in succession into an air-furnace, in which the draft can be well regulated by an ash-pit door, and a flue-register; and I raise the heat gradually until, in about twelve hours' time, it has attained a high degree of redness, bordering on whiteness, but avoiding such a degree of whiteness as would melt cast iron. I then continue the high degree of heat to my first pot as equally as possible for eighty hours longer, and afterwards let it remain twelve hours to cool. I take this long time for raising the heat and for cooling the furnace, because such would necessarily be the case in large furnaces, and because this process ought to afford a fair sample of all the conditions of the large working; in fact, instead of twelve hours to heat, and twelve hours to cool, it ought to be exactly the

same time that the large furnace would take to be heated and cooled. And I proceed in the same manner with my remaining nineteen pots, except that the time of equable heat, exclusive of the time of heating up and cooling down; I continue on my second for seventy-six hours, my third for seventy-two hours, and so on, decreasing four hours on each pot for the times of equable heat, until the twentieth pot, which will be kept only four hours in equable heat.

After the product of the first pot is cold, I separate it from the sand and charcoal, and put the product in a cast steel-maker's crucible into his furnace, and give a melting heat to it; the product from almost all sorts of iron ore will then pour out into an ingot, and afford a sample of cast iron. I proceed in the same manner with the product of the second pot, and with the succeeding pots, until the metal will not flow, but will remain, while hot, in a pasty state, and can be worked into a lump by stirring with an iron rod, so as to separate the scoria in the manner of puddling; it may then be wrought under the hammer, or pass through grooved rollers, and thus be formed into a malleable bar, which, from most ores, will be a bar of mild steel. The product from the next pot in the succession will, from most ores, form a bar of milder steel; and the product of the next pot will either produce a bar of still milder steel, or will be a bar of malleable iron; and the products of the remaining pots will produce bars of malleable iron, decreasing in quality, until that from the lowest time of heating will, from most ores, be too crude for use.

The last pot in the succession, from which the metal will flow, will produce cast steel, as will also two or more pots preceding that; but the cast steel will be of different qualities; and all the pots subjected to longer times of heating than the longest times of those which produced cast steel, will produce cast iron of various gradations of quality.

For the judgment for carrying the invention into effect according to the second method, I proceed as described for the samples according to the first method, except that I take finely pulverized charcoal and lumps of burnt mine, not exceeding three or four ounces in weight, and weigh off charcoal equal to twenty-six per cent. of the weight of the ore for the first pot, of twenty-four per cent. for the second pot, and so descending one per cent. for each pot, until the lowest will have but six per cent. of charcoal; and I pack the ore and the charcoal together into the pot or crucible, so that they shall be as well mixed as possible; I then subject all the pots to twenty-four hours of equable heat, exclusive of the time of heating up and cooling down, and treat the respective products in the cast steel-maker's crucibles in the same manner as hereinbefore described; and I make a second series of samples of the same proportions, to wit, from twenty-five down to six per cent. of finely pulverized charcoal, and subject all the pots to forty-eight hours of equable heat; and for some ores it may be useful to make a third series of samples, the same as the second, except that the equable heat may be continued for seventy-two hours, more or less.

It may, in the case of some extraordinary ores, be needful to extend the series of testing samples from the greatest time of heating, or the greatest proportion of charcoal, to still greater times or proportions, or to reduce the least degrees in the series to still less degrees, and also to vary the sizes of the lumps of roasted ore to be cemented.

And it may also be useful to afford tests for still finer shades of difference, by preparing samples intermediate between any two of the regular series.

And when I wish to obtain approximate indications with little time and labour, I commence with a series of five pots, with quadruple the differences of the series of twenty

pots, and afterwards make intermediate samples, as the peculiarities of the ores, and the demands of the market, may require.

In carrying the improvement into effect on the larger scale, I use the ordinary steel-converting furnaces, and proceed, as nearly as possible, in charging them and in fining them as I proceed with the testing samples which I desire to imitate.

And I declare, that I lay no claim to any part of the process of roasting the ore, or of casting the iron or the steel, or of the mode of producing the malleable steel or malleable iron from the cemented product; nor do I claim the cementation of roasted ore as far as chemical experiment is concerned, because I am aware that such chemical experiments have heretofore been made. But I do claim the application of the process of cementing roasted ore in a manufacturing way, regulated by a systematic series of testing samples for the obtaining of a new product, capable of being, by the simple and well-known process of puddling, balling, or looping, and afterwards passing under the hammer, or through the grooved rollers, in the manner commonly employed for the formation of malleable steel or malleable iron, as hereinbefore described.—[*Inrolled in the Inrolment Office, January,* 1837.]

To JOHN ODY, *of the Strand, in the county of Middlesex, patent truss manufacturer, for his invention of an improved construction of water-closets.*—[Sealed 13th May, 1835.]

THIS improved construction of water-closets has an additional cistern or reservoir for retaining a suitable quantity of water around the outside of that vessel which is called

the basin of the closet, and which is constructed nearly as usual in ordinary water-closets, but with free communication for the said water to pass from that additional retaining cistern into the interior of the basin, through several small apertures formed around the lower part of the basin or neck thereof, which neck leads down to the discharging valve at the bottom of the basin, and which discharging valve is nearly the same as usual in what are called valve-closets; but the basin standing as it were immersed in the water contained in the retaining cistern, the surface of the water will stand at the same level within the basin as it stands in the said retaining cistern around the outside of the basin; and whenever the discharging valve is opened, in the usual manner of ordinary water-closets, in order to let down and empty the contents of the basin, the surrounding water, which is contained, as aforesaid, in the retaining cistern, by rushing rapidly down through the aforesaid communicating apertures, at the lower part of the basin, will run out from that cistern into the neck of the basin, so as to augment the rush or flow downwards through the open valve by all the quantity of water contained in the cistern, in addition to what is contained in the basin, and thereby a complete discharge of the basin is ensured. And when the surface of the water in the said retaining vessel is in the act of sinking, in consequence of such flowing out through the said apertures, it causes the descent of a floater, which is suitably connected and applied for the opening a stop-cock or valve in the service-pipe, which pipe descends from an elevated cistern or other supply, as usual, for conveying a forceable influx stream of water into the basin at the hinder and upper part thereof, with a plate called a fan, fixed in the usual manner within the basin, before the entrance of the influx, in order to disperse the stream thereof around the internal surface of the

basin in a suitable manner, for washing the same effectually before it runs down through the aperture of the opened valve, as is usually done in ordinary water-closets. And after the said discharging valve at the lower part of the basin is closed in the usual manner, so that the said influx of water from the service-pipe into the interior of the basin, will no longer be allowed to run down through the aperture of the discharging valve: nevertheless, the said influx into the interior of the basin will be continued for a short time, in order that the water may accumulate within the basin, and also around the outside of the basin in the aforesaid additional retaining cistern, in consequence of the communicating apertures aforesaid, in the neck at the lower part of the basin, now allowing the water to pass freely from the basin into the said cistern, in the contrary direction to that in which the water passed through the same apertures when the basin was emptying itself; but as the surface of the water rises in the basin and in the retaining cistern, the aforesaid floater will be raised at the same time, and by its connexion with the aforesaid stop-cock or valve in the service-pipe, will begin to close the same, until by the time that so much water has accumulated in the cistern (and consequently within the basin) as will fill the same to the intended height, the floater will have quite closed the stop-cock or valve in the service-pipe, so as to cut off the further influx of water into the basin, but retaining a proper depth of water within the basin, as well as around the outside thereof, until such time as that the discharging valve of the closet shall be again opened.

Fig. 1, Plate XI., is a horizontal plane, looking down on the apparatus; fig. 2, a front elevation; fig. 3, an end elevation; and fig. 4, a vertical longitudinal section: A, A, B, B, is the basin, which is made of earthenware, as usual, but may be made of metal; the lower end of the neck

does not reach quite down to the border of the aperture, which is closed or opened by the discharging valve D; but instead of so reaching down, the lower end of the neck B, B, leaves an annular opening 1, 1, all around, for the passage of water into or out of the additional retaining cistern 2, 2, 3, 3, which includes the lower part of the basin within it, so that the water contained in the cistern 2, 2, 3, 3, will surround the outside of the basin A, B, and that water will communicate with the inside of the basin through a series of apertures which are upright slits, formed in the sides of a cylindrical socket 4, 4, to which the basin is firmly affixed by means of a flange *b*, *b*, projecting around the outside of the neck B, B, and applying upon a corresponding flange at the upper end of the socket 4, 4, those flanges being fastened together by small nuts and screws.

By means of the socket 4, 4, the basin is held and supported in its intended place within the retaining cistern 2, 3, but free passage is left for the water contained in the cistern 2, 3, beneath the lower orifice of the neck B, B, of the basin at 1, 1. The outside of the socket 5, 5, at the bottom of the retaining cistern 2, 3, is made to fit into a socket within a circular rim 6, 6, which forms a prominent border surrounding the aperture for the discharge valve D; E, E, is the metal chamber, containing the discharging valve D, and usually called the container; its cover F, F, which is fastened on by screws, is formed with the aperture for the discharging valve, and with the rim 6, 6, around the aperture.

The container E, E, F, F, serves as a base for sustaining all the upper parts of the apparatus, and it terminates below with a circular neck G, surrounded by a flange, which is screwed down to the wood floor of the apartment in which the water-closet is fixed.

The discharging valve D, is mounted on a horizontal

axis or spindle *d*, which comes through a socket formed in joint between the cover F, and the flange of the retainer E, E, so as to project out at the outside thereof; and a short lever *h*, figs. 1, and 2, is fixed upon the extreme end of the axis *d*, with a groove or slot in that lever, to admit a pin *e*, which is fixed into the loaded lever H, *f*, L.

The lever H, *f*, L, is actuated by an upright rod K, having a pull-up handle *g*, at the upper end of it, and which handle, when pulled up, causes the pin *e*, of the lever H, *f*, L, to act in the groove of the short lever *h*, in a suitable manner for turning down and opening the internal discharging valve D, as is shown in fig. 4.

The overflow waste-pipe 8, 8, *k*, *k*, stands up within the additional retaining cistern 2, 3, the upper part 8, 8, being fastened to the bottom thereof 3, 3, by a screw joint, whereby the part 8, 8, is united to the lower part *k*, *k*, of the pipe, which is beneath the bottom 3, 3, of the cistern; and which part *k*, *k*, has the usual bend or inverted syphon in it, near to where it joins to the container E, for retaining as much water in the overflow pipe 8, *k*, as will stop the ascent of foul air.

The upper orifice of the overflow pipe 8, 8, is at the exact level at which the water is intended to stand within the retaining cistern 2, 3, and also within the basin A, B, as is shown by the dotted lines; and all influx of water, after it has attained that level, will overflow down the pipe 8, 8, which serves as a substitute for the ordinary overflow pipe that is usually joined to the basin A, A, in valve water-closets: M, is the fan, fixed withinside of the basin A, at the upper and hinder part thereof, to disperse the influx of water around the interior of the basin.

The pipe N, which brings down the influx of water from the elevated reservoir, is joined to the basin by the intervention of a stop-cock 9, whereof the turning plug 10, has

a lever arm 1, 1, fixed on the end of it, and to the extremity of the lever 11, a hollow float 12, is connected, which will open the stop-cock 9, and admit an influx of water into the basin A, A, whenever the water subsides in the cistern 2, 3, and *vice versa.*

The supply-pipe N, may be joined to the cock 9, by a screw, of the kind which is termed an union joint, and the cock may be joined to the basin by screwing into a socket P, which is cemented to the outside of the basin A, A, and fastened thereto by the same screws which fasten the fan M, in its place, withinside the basin.

And further, by a slight alteration in the form and magnitude of the basin A, B, and of the additional retaining cistern 2, 3, from what is represented in the drawing, my said improved construction of water-closets may be modified suitably for receiving urine, in order to form urinatory water-closets for buildings where assemblies for public business are held. In such case, the upper border or open top of the basin A, A, should be higher than is represented in the drawing, by about fifteen inches, or more at the hinder part; but it should be about nine inches lower in the front part than at the hinder part, as is denoted by the dotted lines 13, 13, in fig. 4. The lower part A, and neck B, of the basin may be formed as in the drawing,—the additional height of the said upper border of the basin being suitably formed, and situated at a suitable height above the floor, for the convenience of making urine into the same in a standing attitude.

When my improved construction is to be used for such urinatory water-closets, it will be more cleanly to construct the additional retaining cistern 2, 3, of earthenware instead of metal, which can be readily done by giving some roundness of form to the angles.

Having now described the nature of my said invention,

and in what manner the same is to be performed, I hereby declare that my invention consists in the improved construction of water-closets, hereinbefore described; the essential character of that improved construction being, that an additional water cistern is applied to retain water around the outside of the basin of the water-closet, having a suitable aperture or apertures around the neck at the lower part of that basin, to form a free communication for the water to flow from the said retaining cistern into the interior of the basin, or the contrary way, in order that the water contained in such retaining cistern may rush down through the discharging valve whenever the same is opened; and also that the falling and rising of the surface of the water in the said cistern is caused, by means of a floater, to open or shut the stop-cock or valve in the water pipe, which conveys the usual influx of water into the basin, independently of the opening or shutting of the discharging valve at the bottom of the basin.—[*Inrolled in the Inrolment Office,* 1835.]

To Frederick Bowman, *of Great Alie-street, in the county of Middlesex, sugar-refiner, for an improvement in the process of renewing the virtues of animal charcoal when exhausted, being a communication from a foreigner residing abroad.*—[Sealed 17th August, 1835.]

It is well known that animal charcoal, or carbon, as it is generally called, is very extensively used in the manufacture of sugar, for the purpose of bleaching it. The sugar is filtered through the carbon, which has the property of whitening it; but after being used some time, the bleaching properties of the carbon become exhausted; it is, therefore, necessary that they should be renewed, and the method

generally employed to effect this, is by subjecting the exhausted charcoal to a considerable heat, which is done by putting it into iron retorts, and heating them until they become red hot.

In this process a considerable quantity of carbon is congregated in one large mass in the retort; and as the whole of the carbon must be subjected to a very high temperature, the retort is obliged to be over-heated, the consequence of which is, that the outer part of the carbon, or that which is nearest the surface, becomes completely vitrified, and its bleaching properties thereby nearly, or perhaps entirely, destroyed before the interior part of the mass has become heated sufficiently. Now, the object of this invention is, to subject the carbon in an apparatus to a slow but progressive degree of heat, by means of which all parts of the carbon become in turn renewed, without submitting any part to any deleterious degree of heat.

The manner of effecting this is as follows:—The carbon is placed in an oven or reverberatory furnace upon a shelf, in a thin layer, and subjected to a gentle heat; it is then removed to another shelf, and subjected to a greater degree of heat, being all the while kept stirred, for the purpose of exposing all parts to the same degree of temperature.

The carbon may be removed as many times as shall be thought desirable, the heat in the different situations gradually increasing; and care must be taken that the highest degree of heat to which the shelves or plates are exposed does not exceed a red heat.

It will be found, that by submitting the carbon, or animal charcoal, to heat in this manner, that the bleaching properties are more effectually renewed, and there is not that waste occasioned by vitrifying some parts of the carbon, which thereby become useless.

The claim is, the employment of a process as above described, by which every portion of the carbon or animal charcoal is successively submitted to a gradually increasing degree of heat, for the purpose of renewing the bleaching properties thereof.—[*Inrolled in the Inrolment Office, February,* 1836.]

To WILLIAM MORGAN, *of the Kent-road, in the county of Surrey, Esq., for his invention of improvements in certain kinds of steam engines.*—[Sealed 13th March, 1834.]

THIS invention applies to that description of steam engine which has a pendulous piston working in a segmental steam chamber, and the object of the invention is an improved mode of obtaining rotary motion from the vibratory action of the piston.

This is effected by fixing an arm or lever upon the axis of the oscillating piston. The arm or lever, by this means, receiving vibratory motion from the action of the piston will, by means of a connecting rod, attached at one end to it, and at the other to the crank placed above, communicate motion to the crank shaft, and cause it to revolve.

Another part of the invention is, a method of connecting the induction and eduction valves, so that the pressure of the steam on the eduction may have the effect of closing the induction valve.

This arrangement is only claimed as applied to steam engines of the above construction, namely, those which have pendulous pistons vibrating in a segmental steam chamber.—[*Inrolled in the Inrolment Office, September,* 1834.]

To Henry Phillips, *of Exeter, chemist, for his invention of certain improvements in purifying gas for the purpose of illumination.*—[Sealed 17th August, 1835.]

The object of this invention is, to free coal gas from the ammonia which has such a corrosive effect upon all brass and copper fittings with which it may come into contact. The method employed by the Patentee for carrying this purifying process into effect, is by submitting the gas to the action of a saline solution, in the following manner:—

A suitable vessel, of a quadrangular shape, is fitted with a number of shelves perforated with holes, and upon these shelves is placed refuse tan, twigs, furze, pebbles, linen rags, or any other substances capable of retaining the saline solution for a time. Near the top of the vessel, and immediately below its lid, a perforated plate or shelf is placed, and covered over with a coarse linen cloth; this cloth is fastened to the plate by nails, which are driven through the holes, their points extending downwards for about an inch, or an inch and a half below the plate. The cover or lid of the vessel is then placed on and secured by a water joint so as to prevent any of the gas from escaping; the saline solution, consisting of alum, or any other suitable salt dissolved in water, is then admitted by a pipe, and allowed to run on the coarse linen cloth, the capillary attraction of the fibres will cause the saline solution to be distributed throughout its entire surface, and to drop down upon the tan, furze, twigs, or other substances on the shelf below. From thence the liquor continues dropping upon shelf after shelf, until it reaches the bottom of the vessel, whence it is extracted by means of an inverted syphon.

The gas to be purified is to be admitted at the lower part of the vessel, and allowed to rise through the tan, twigs, furze, or other substances upon the perforated plates or

shelves, being subdivided in its passage, and obliged to enter into close contact with the saline solution, which deprives it of the ammonia.

When the gas has ascended to the upper part of the vessel through the coarse cloth, it is conveyed away by pipes in the ordinary manner; but if, upon testing the gas with litmus paper, it should be found that it has not been wholly deprived of the ammonia, it may, in like manner, be passed through another purifier similarly constructed.

The Patentee, in conclusion, says, that he lays no claim to the hereinbefore described apparatus separately, as it is constructed upon a similar plan to that employed in purifying gas by the dry lime process; he only claims it as being part of the apparatus by which his invention is carried into effect: and he claims more particularly as the invention secured to him by the present Letters Patent, depriving coal gas, employed for the purposes of illumination, of the ammonia contained therein, by passing the gas through, or causing it to enter into intimate connexion with saline solutions, as above described.—[*Inrolled in the Inrolment Office, February,* 1836.]

To FREDERIC EDOUARD FRAISSINET, *of Covent-garden-square, in the city of Westminster, for certain improvements in the machinery for propelling vessels by steam, by which their speed will be much accelerated, with a diminished power and with a diminished action on the water, being a communication from a foreigner residing abroad.*—[Sealed 26th July, 1838.]

THIS invention consists in the construction of a rotary propeller in the form of a screw, and its application to the purpose of propelling ships, boats, and other vessels upon

the water. This improved propeller is somewhat similar in construction to the Archimedes screw, the application of which, to a similar purpose, has already been attempted, but without entire success. The previously proposed construction, however, differs from the present invention in some very essential particulars, which I shall now proceed to point out.

Upon examining the thread of an Archimedes screw, constructed upon the true principles, it will be found that the thread or surface, from the commencement to the end, consists of an uniform helical curve, the thread of the screw being always perpendicular to the axis. Now, the inventor has discovered that helical surfaces, placed exactly parallel to each other (as is the case in the Archimedes screw), when employed in place of paddle-wheels for propelling boats or other vessels, is liable to as great an inconvenience as the common paddle-wheel, because, in order to obtain a continued pressure against the water, the thread of the screw ought to increase in its obliquity in a greater proportion than the ship advances.

To obviate, therefore, the inconvenience of the parallel Archimedes screw propeller, the inventor has substituted a parabolic curve, of which he makes the thread of the screw to consist, instead of the parallel curve; the inclination of this parabolic curve must be such that the interior extremity of the thread may enter the water without creating a shock, which would have the effect of counteracting the power of the engine; and the progressive increase of inclination of the thread, as the screw revolves, must be such that the whole of its surface, from the commencement to the end of the thread, will continue pressing against the water, and also receive from the water that continued resistance which is necessary to cause the vessel to advance.

In the Archimedes screw, also, the helical surface which

forms the thread is joined to the axle or central shaft so as to form one entire helical surface, extending from the axle to the outer edge of the thread; but the present inventor has discovered that the propeller will work with greater facility if he leaves a vacant space between the central shaft and the thread, or propelling surface of the screw, so that the thread is only attached to the shaft by a number of supports, thereby allowing the water to flow out near the axle after it has exerted its resistance against the surface of the thread.

It may here be observed, that in all the schemes at present known for propelling vessels, and in which the Archimedes screw is employed as a mover, the thread has been made to consist of too great a number of spirals. In the present instance, only one or two spirals are used, as a greater number would not only be useless, but really disadvantageous, by the great friction that would be occasioned from the rapid rotation of the propeller against the water. This is a fact that has not hitherto been noticed.

The distance between the two extremities of the spiral is nearly equal to the external diameter of the screw, and the diameter will, of course, depend upon the size of the ship or other vessel. For example, a ship of 120 feet in length, and 13 feet in breadth, the screws to be adapted to the two sides, should be about five feet in diameter.

I will now proceed to describe the drawing in which I have shown the improved propeller adapted to both sides of a vessel:—Fig. 1, Plate XII., is a side elevation of a vessel, and fig. 2, a plan view, with the propellers properly mounted in connexion with gear work, intended to be driven by a steam engine in the ordinary manner. Fig. 3, represents a front view of one of the screw propellers; *a*, is the main shaft; *b*, *b*, the thread or propelling surface, which acts upon the water; *c*, *c*, *c*, *c*, are arms made of

wood, iron, or other suitable material, supporting the thread of the screw; *d, d, d, d,* shows the vacant space between the thread and the central shaft of the screw, intended to allow the water to flow through to prevent the screw from choking.

In conclusion, I would wish it to be understood that I claim the right of placing the screw above described in whatever situation I may deem desirable, according to circumstances; for instance, I may either partially or totally immerse it in the water, or I may place it either behind, before, or on each side of the vessel. For vessels that are intended for navigating the sea, it is preferable totally to immerse the propeller in the water. The speed of the vessel will, of course, depend upon the rapidity with which the screw is made to revolve.—[*Inrolled in the Rolls Chapel Office, January,* 1839.]

To LUKE HEBERT, *of Staple Inn, in the city of London, civil-engineer and mechanical-draftsman, for certain apparatus and processes for storing, cleansing, and preserving grain, being a communication from a foreigner residing abroad.*—[Sealed 3d November, 1838.]

THIS invention is divided into two parts, consisting, firstly, of an apparatus for destroying or removing insects from corn or other grain; and secondly, in an improved method of storing the grain, or constructing a moveable granary or storehouse.

The first part of the invention is an apparatus consisting of two cylinders, one placed inside the other. The outer cylinder is constructed of wooden planks, bound tightly together by means of iron hoops; the inner one consists of a wooden or metal cylindrical framing, over which wire

gauze is extended, and is intended for the reception of the grain.

Fig. 1, Plate XI., represents a longitudinal section of this apparatus: *a, a,* is the outer cylinder, into which steam is admitted by a pipe *b,* furnished with a stop-cock; the inner or wire cylinder *c,* is mounted on the shaft *d,* which turns in bearings *e, e,* formed in the cross pieces or bearings *f, f,* and the outer cylinder.

Corn is supplied by a hopper *g,* from whence it passes through peculiarly-formed valves *h, i,* hereafter described, and descends by the pipe *j,* into the wire cylinder, in which it is subjected to the action of the steam, and is kept in an agitated state by the revolution of the cylinder.

By this means the grain becomes thoroughly cleansed; and, owing to the oblique position of the cylinder, it is gradually brought to the exit aperture at *k,* and falls down the pipe *l,* into the valve *m,* in which it is measured, and then deposited in any suitable receptacle placed below.

It will be seen by the construction of the valves *h, i,* and *m,* no steam can possibly escape from the cylinder. The way in which these valves are formed, and the manner of working them, is described as follows:—They each consist of a cylindrical or conical plug or stopper, having longitudinal grooves or recesses formed in them; and when the upper recess is filled with grain the plug is caused to revolve by means of a strap or band upon its axle; and when the recess or groove containing the grain is brought opposite the pipe *j,* it allows the grain to fall down into the lower valve *i,* and from thence it is passed, by the bent pipe, into the cylinder.

These two plugs or valves are connected together by means of an endless band, and consequently revolve at the same speed.

The second part of the invention consists of a large

cylinder, constructed of wood or iron, or of both of these materials, and is capable of containing upwards of three hundred quarters of grain. In the interior of this cylinder is a smaller one, and the space between the two is divided into a number of compartments formed by radial partitions, see fig. 2, for holding the grain. The partitions forming these compartments are of planks of wood glued together, and are retained in their places by an iron framework at each end of the cylinder. The external part of the cylinder is formed of bars of wood placed at small distances apart, and the whole is covered over with wire gauze for the purpose of admitting air and preventing the escape of the grain. The inner cylinder is constructed in a similar manner, and a ventilator or fan-wheel may be placed at one end, for the purpose of exhausting the cylinder and drawing air through the grain, in order, by that means, to dry it, if any damp should be found to exist, which may probably be the case after the grain has undergone the first process of cleansing.

The Patentee says, in conclusion, that having described the invention communicated to me, and the manner of carrying the same into effect, I will point out what I claim as the invention, secured to me by the present Letters Patent. First, for destroying or removing insects from corn or other grain, I claim the mechanical arrangement whereby steam is made to operate in a closed vessel upon grain put in motion in an interior vessel, and also the valve apparatus by which the grain is received and discharged in measured quantities, without any material escape of steam from the vessel containing it; and secondly, for a moveable granary or storehouse, I claim the general combination of parts constituting the entire machine, and all modifications of that combination.—[*Inrolled in the Inrolment Office, May,* 1839.]

To Charles Madeley, *of Gibson-hall, in the parish of Coleshill, in the county of Warwick, farmer, for his invention of a scarifier or harrow.*—[Sealed 1st June, 1833.]

This invention is a new method of arranging the teeth of harrows, by means of which each tooth shall take a separate line of action, in order that the whole surface of the ground may be more effectually operated upon. The contrivance for accomplishing this object is a harrow, constructed of zigzag bars, upon which the scarifiers are fixed.

Fig. 1, Plate XII., represents a side view, and fig. 2, a plan view of the improved harrow: *a, a,* are the running wheels, mounted on the end of a frame *b, b*: the scarifiers or teeth *c, c, c,* are fixed on the bars *d, d,* which are made of wrought iron, and in the form represented in the drawing.—[*Inrolled in the Inrolment Office, December,* 1833.]

To Alexander Craig, *of Edinburgh, for improvements in steam engines, being a communication from a foreigner residing abroad.*—[Sealed 25th November, 1834.]

This invention is on the principle of what is called Barker's mill. Plate XI., fig. 1, represents a side view of the engine, the outer plate being removed; fig. 2, is a transverse section. The engine consists of two hollow arms mounted on a shaft, the whole being enclosed in a box or case; steam is admitted from a pipe *a*, through a steam box *b*, to the hollow end of the shaft *e*, and thence it passes up the arms *d, d,* and escapes from holes made at the ends of these arms, as shown at *e, e.*

The width of the arms at the centre, or near the shaft, is about six inches, and at the ends about one and a half inches. The size of the hole through which the steam

escapes at the end of each arm, is about one quarter or one eighth of an inch in diameter, and the holes are made in such a manner that the steam shall issue at right angles with the shaft.

The Patentee states, that it will be found to be a point of considerable importance to give the revolving arms such a form as shall subject them to the least possible resistance from the air in their revolutions, and therefore, instead of making them in the form of round tubes, as has been hitherto done, he makes them of a form that results from making each half of the arm a segment of a large circle, so that when the two halves are united, the edges of the tube shall present an acute angle.

The tubes may also be made elliptical or oval, and the same end will be in a great measure attained.

The Patentee says, that he claims as his invention, "simply giving the oblate or flat form to the revolving arms, and enclosing them in a case, so that, in proportion to their capacity, they shall experience much less resistance from the air than they have heretofore been subjected to, and thereby obtaining a greatly increased power."

In conclusion, it is stated that this engine is found to act with great power, and it will be evident that in addition to other uses, these steam engines will be particularly applicable to locomotive purposes, in consequence of their lightness. We are very much inclined to doubt this conclusion, as it must be evident that, in order to obtain any considerable degree of power, an immense expenditure of steam must take place.—[*Inrolled in the Inrolment Office, May,* 1835.]

To Richard Badnall, *of Cotton Hall, in the county of Stafford, gentleman, for his invention of a certain improvement in the manufacture of carpets and other similar woven fabrics; which improvement is effected by the introduction of a certain article of commerce not hitherto so employed or used in such manufactures.*— [Sealed 27th June, 1838.]

This invention of a certain improvement in the manufacture of carpets, consists in the employment of silk in place of wool or other fibrous materials for producing the coloured patterns or figures on the surface of carpets or coverings for floors of rooms. I propose no alteration or improvement in the ordinary manual operations of weaving carpets, but only in the adoption or use of silk as a vastly superior material for producing the patterns or devices that is covering or partially covering the face of the carpet; which silk may be employed for this purpose in connexion with any other material applicable to the making of carpets, and be prepared and worked by any suitable machinery. When the patterns are produced by wool, it is difficult to preserve brilliancy in white or light colours, but by substituting silk, much brilliancy and beauty is obtained, and a very superior article produced.

I wind my silk, as usual, from the hank, and double it to the required size, and then, having twisted it into suitable cords, in the manner of preparing sewing silks, I dye the silk so prepared, according to the colours wanted to form the patterns or devices on the face of the carpet.

When the silk is thus rendered fit for use, I apply it in the way worsted or other threads are usually applied in the loom when weaving carpets, and produce, by the operation of weaving, either by the Jacquart or Drawboy, or

other means, patterns or devices in silk of very brilliant colours upon the face of the carpet.

I desire it, therefore, to be understood, that the particular feature of improvement which I claim in the manufacture of carpets, is the employment of silk in any proportion to the other materials of which the carpet is made, either in conjunction with wool or cotton, or other material, or alone, for producing figures or coloured devices upon the face of a carpet of greater brilliancy than have hitherto been attained by worsted or any other material.—[*Inrolled in the Rolls Chapel Office, December,* 1838.]

To Francis Molineux, *of New Bridge-street, Blackfriars, gentleman, for certain improvements in machinery or apparatus for making paper.*—[Sealed 25th May, 1838.]

This invention consists of three different apparatus to be used as pulp strainers. The first described, is a peculiar arrangement of vertical rollers, between which the pulp in passing is strained. In the second arrangement, the pulp is strained through the perforated sides of a trough, which has a backward and forward motion given to it, for the purpose of clearing the interstices or perforations from any knots that might otherwise adhere and clog up the strainer. The third apparatus consists of a metal cylinder perforated with small holes, and having a piston or plunger adapted to it for the purpose of creating a partial vacuum, and by that means straining the pulp.

Plate XII., fig. 1, represents a sectional plan view of the first described apparatus: *a, a, a,* is the pulp vat or trough; *b, b, b,* a number of rollers arranged in a circle,

and placed perpendicularly in the trough; *c*, is an upright cylinder, into the top of which the pulp flows after it has been strained; *d*, is an upright shaft passing down the middle of the cylinder *a*, and on this shaft a large spur wheel is mounted, which gears into pinions on the axles of the rollers *b, b*, so that all the rollers are made to revolve one way, and by this means free themselves from knots and other extraneous matters; *e, e*, is a bar mounted on the shaft *d*, carrying a rod at each end; this bar revolves as the shaft *d*, turns on its axis, and by means of the rods which project downwards the pulp is disturbed and agitated. Fig. 2, represents a section of the second arrangement, consisting of a wooden trough *a, a*, lined with copper; *b, b*, is another trough, and *c, c*, a third trough within *b, b*. The trough *c, c*, has its sides formed of plates or strips of metal, with interstices between them; or it may be made of perforated metal; but this does not constitute any part of the invention. It has a backward and forward motion given to it by means of the excentric *d*, which acts against a stud fixed on to a rod *e*, and to which the trough *c*, is attached; *f*, is a plunger for facilitating the straining operation, and may be worked in any convenient manner.

The action of this strainer is as follows:—Pulp is supplied to the trough *e*, through the sides of which it is strained with the assistance of the piston or plunger *f*, the interstices or perforations in the sides being kept free from clogging by the reciprocating motion of the trough caused by the excentric. The pulp is thus forced into the trough *b, b*, from whence it escapes over its sides into the trough *a, a*, and from thence to the paper machine. The trough *b, b*, is only for the purpose of preventing the pulp in the trough *a, a*, from being too much disturbed.

The Patentee, in the first arrangement, does not confine

himself to placing the rollers in a circle, as they may obviously be placed in various other manners, but claims a paper strainer, consisting of a series of rollers having rotary motion given to them for the purpose of clearing them from knots, or otherwise. He claims, secondly, a pulp strainer, constructed on the principle set forth in fig. 2; and, thirdly, a strainer, consisting of a cylinder having its sides perforated with holes, and a piston or plunger working within it, for the purpose of partially exhausting the vessel, and by these means assisting the operation.—[*Inrolled in the Inrolment Office, October,* 1833.]

To Robert Joseph Barlow, *of Rudley, in the North Riding of Yorkshire, for his invention of certain improvements in springs, applicable to carriages and other purposes.*—[Sealed 25th November, 1834.]

This invention is described as consisting in a peculiar arrangement of springs and levers, whereby carriage springs may be constructed much lighter and cheaper, and may be more easily repaired or replaced when required, than those at present in use. The spring itself has very little elastic play, but that little is multiplied to any extent by means of a lever, consisting of two arms of unequal length; the shorter arm acts upon the spring, and the longer one sustains the carriage.

Fig. 1, Plate XII., represents a side view of the spring detached from the carriage. It consists of a number of plates of steel *a, a,* which are placed in a recess formed in the framework *b,* of the carriage. These steel plates are divided into two sets, which are kept any required distance apart by two iron stops *c, c.* The plates lie one on the other, and do not require any fastening, as the recess in the

framing is formed in a suitable manner to receive them. If the carriage is intended for a good road, the stops *c, c,* should be about the thickness of four plates; but if the carriage is required for bad roads, thinner stops should be used, and by this means, room for an increased number of steel plates is obtained; and by adding two or more, a greater degree of stiffness is given to the spring.

The lower set of springs is supported by a bolt *d,* which should be securely fixed in the framing, as it is intended to bear the weight of the carriage. Another bolt *e,* rests upon the upper set of plates; and it is upon this bolt that the carriage exerts its force, as will be hereafter described.

Fig. 2, represents the method of adapting this arrangement to a carriage. The carriage is suspended in the usual way, to what appears to be a C spring, but what is in reality only a rigid curved lever, having its fulcrum at *f,* and, therefore, having two arms, a short one *g,* and a long one *h.*

It will now be seen, that when a weight is applied at *i,* to the longer arm *h,* of the lever, it will cause the short arm *g,* to depress the stud or bolt *e,* and by this means cause the spring to collapse. The Patentee says that the invention is susceptible of various modifications in its application.

Fig. 3, represents a method of applying the invention by means of spring-bolts and levers, arranged to act in a lateral direction on the spring. In this arrangement, the body of the carriage should be hung in shackles at the end of each of the arms of the lever, in a similar manner to that in which mail-coaches are now suspended.

Fig. 4, represents another modification, in which only one set of plates are used. In this instance the steel plates are supported at each end, and the weight of the carriage acts upon the spring by means of bridle pieces *i, i,* which tend to force the spring upwards.

Fig. 5, shows another method of constructing springs for carriages. It consists in placing an air-bag (made of caoutchouc, and enclosed within several coverings of leather) in a recess or mortice made in the framing; by this means, a spring, having very little elastic play, is produced; *a, a,* is the recess or mortice; *b,* the air bag, enclosed between two metal plates *c,* and *d.* The carriage acts upon the spring by pressing down the stud or bolt *e,* as in figs. 1, and 2; and the elastic play in the spring is regulated by means of screws *f, f,* which, by being turned, will raise the metal plate *d.*

The Patentee says, in conclusion, that the invention is equally applicable to chairs and sedans; and he claims, as his invention, the construction of springs, as hereinbefore described, which have very little elastic play, and are much lighter, and easier of construction and repair than those now in use, such springs being acted upon by unequal armed levers, in such a manner, that by suspending or placing the body of the carriage or other weight on the longer arm of the said levers, any required degree of elastic play may be obtained.—[*Inrolled in the Inrolment Office, May,* 1835.]

ORIGINAL COMMUNICATION.

(To the Editor of the London Journal of Arts.)

REPORT, BY ANDREW URE, M.D., F.R.S., &c., UPON THE ASPHALTE ROCKS OF VAL-DE-TRAVERS, SEYSSEL, PYRIMONT, &c., AND THEIR APPLICATION AS A MASTICH IN FOOT-PAVEMENTS, ROOFS, AQUEDUCTS, CISTERNS, &c.

It is a very remarkable fact, in the history of the useful arts, that asphalte, which was so generally employed as a solid and durable cement in the earliest constructions upon record, as in the walls of Babylon, should, for so many thousand years, have fallen well nigh into disuse among civilised nations. For there

is certainly no class of mineral substance so well fitted as the bituminous, by their plasticity, fusibility, tenacity, adhesiveness to surfaces, impenetrability by water, and unchangeableness in the atmosphere, to enter into the composition of terraces, foot-pavements, roofs, and every kind of hydraulic work. Bitumen, combined with calcareous earth, forms a compact, semi-elastic solid, which is not liable to suffer injury by the greatest alternations of frost and thaw, which often disintegrate, in a few years, the hardest stones, nor can it be ground to dust and worn away by the attrition of the feet of men and animals, as sandstone, flags, and even blocks of granite are. An asphalte pavement, rightly tempered in tenacity, solidity, and elasticity, seems to be incapable of suffering abrasion in the most crowded thoroughfares; a fact exemplified of late in a few places in London, but much more extensively, and for a much longer time, in Paris.

The great Place de la Concorde (formerly Place Louis Quinze) is covered with a beautiful mosaic pavement of asphalte; many of the promenades on the Boulevards, formerly so filthy in wet weather, are now covered with a thin bed of bituminous mastich, free alike from dust and mud; the foot-paths of the Pont Royal and Pont Carousel, and the areas of the great public slaughter-houses, have been for several years paved in a similar manner with perfect success. It is much to be regretted that the Asphalte Companies of London made the ill-judged, and nearly abortive, attempt to pave the carriage-way near the east end of Oxford-street, and especially at a moist season most unpropitious to the laying of bituminous mastich. Being formed of blocks not more than three or four inches thick, many of which contained much silicious sand, such a pavement could not possibly resist the crash and vibration of many thousand heavy drays, waggons, and omnibuses daily rolling over it.* This failure can afford, however, no argument against rightly-constructed foot-pavements and terraces of asphalte. Numerous experiments and observations have led me to conclude that fossil bitumen possesses far more valuable properties for making a durable

* See the conclusion of this article.

mastich, than the solid pitch obtained by boiling wood or coal tar. The latter, when inspissated to a proper degree of hardness, becomes brittle, and may be readily crushed into powder; while the former, in like circumstances, retains sufficient tenacity to resist abrasion. Factitious tar and pitch being generated by the force of fire, seem to have a propensity to decompose by the joint agency of water and air, whereas mineral pitch has been known to remain for ages without alteration.

Bitumen alone is not so well adapted for making a substantial mastich, as the native compound of bitumen and calcareous earth, which has been properly called ASPHALTIC ROCK, of which the richest and most extensive mine is unquestionably that of the *Val-de-Travers*, in the Canton of Neufchâtel. This interesting mineral deposit occurs in the Jurassic limestone formation, the equivalent of the English oolite. The mine is very accessible, and may be readily excavated by blasting with gunpowder. The stone is massive, of irregular fracture, of a liver-brown colour, and is interspersed with a few minute spangles of calcareous spar. Though it may be scratched with the nail, it is difficult to break by the hammer. When exposed to a very moderate heat, it exhales a fragrant ambrosial smell, a property which at once distinguishes it from all compounds of factitious bitumen. Its specific gravity is 2·114, water being 1000, being nearly the density of bricks. It may be most conveniently analysed by digesting it in successive portions of hot oil of turpentine, whereby it affords 80 parts of a white pulverulent carbonate of lime, and 20 parts of bitumen in 100. The asphalte rock of Val-de-Travers seems, therefore, to be far richer than that of Pyrimont, which, according to the statement in the specification of Claridge's patent, of November, 1837, contains "carbonate of lime and bitumen in about the proportion of 90 parts of carbonate of lime to about 10 parts of bitumen."

The calcareous matter is so intimately combined and penetrated with the bitumen, as to resist the action not only of air and water for any length of time, but even of muriatic acid; a circumstance partly due to the total absence of moisture in the

mineral, but chiefly to the vast incumbent pressure under which the two materials have been incorporated in the bowels of the earth. It would indeed be a difficult matter to combine, by artificial methods, calcareous earth thus intimately with bitumen, and for this reason the mastichs made in this way are found to be much more perishable. Many of the factitious asphalte cements contain a considerable quantity of silicious sand, from which they derive the property of cracking and crumbling down when trodden upon. In fact, there seems to be so little attraction between silicious matter and bitumen, that their parts separate from each other by a very small disruptive force.

Since the asphalte rock of Val-de-Travers is naturally rich enough in concrete bitumen, it may be converted into a plastic workable mastich of excellent quality for foot-pavements and hydraulic works at very little expense, merely by the addition of a very small quantity of mineral or coal tar, amounting to not more than six or eight per cent. The union between these materials may be effected in an iron caldron, by the application of a very moderate heat, as the asphalte bitumen readily coalesces with the tar into a tenacious solid.

The mode adopted for making the beautiful asphalte pavement at the Place de la Concorde in Paris was as follows:—The ground was made uniformly smooth, either in a horizontal plane or with a gentle slope to carry off the water; the curb-stones were then laid round the margin by the mason, about four inches above the level of the ground. This hollow space was filled to a depth of three inches with concrete, containing about a sixth part of hydraulic lime, well pressed upon its bed. The surface was next smoothed with a thin coat of mortar. When the whole mass had become perfectly dry, the mosaic pattern was set out on the surface, the moulds being formed of flat iron bars, rings, &c., about half an inch thick, into which the fluid mastich was poured by ladles from a caldron, and spread evenly over.

The mastich was made in the following way:—The asphalte rock was first of all roasted in an oven, about ten feet long and three broad, in order to render it friable. The bottom of the

oven was sheet iron, heated below by a brisk fire. A volatile matter exhaled probably of the nature of naphtha, to the amount of one-fortieth the weight of asphalte; after roasting, the asphalte became so friable as to be easily reduced to powder and passed through a sieve, having meshes about one-fourth of an inch square.

The bitumen destined to render the asphalte fusible and plastic, was melted in small quantities at a time, in an iron caldron, and then the asphalte in powder was gradually stirred in to the amount of twelve or thirteen times the weight of bitumen. When the mixture became fluid, nearly a bucketful of very small, clean gravel, previously heated apart, was stirred into it; and, as soon as the whole began to simmer with a treacley consistency, it was fit for use. It was transported in buckets, and poured into the moulds.

For the reasons above assigned, I consider this addition of rounded, polished, silicious stones to be very injudicious. If any thing of the kind be wanted to give solidity to the pavement, it should be a granitic or hard calcareous sand, whose angular form will secure the cohesion of the mass. I conceive, also, that tar, in moderate quantity, should be used to give toughness to the asphaltic combination, and prevent its being pulverized and abraded by friction.

In the able report of the Bastenne and Gaujac Bitumen Company, drawn up by Messrs. Goldsmid and Russell, these gentlemen have made an interesting comparison between the properties of mineral tar and vegetable tar: the bitumen composed of the latter substance, including various modifications extracted from coal and gas, have, so far as they were able to ascertain, entirely failed. This bitumen, owing to the qualities and defects of vegetable tar, becomes soft at 115° of Fahrenheit's scale, and is brittle at the freezing point; while the bitumen, into which mineral tar enters, will sustain 170° of heat, without injury. In the course of the winter, 1837-38, when the cold was at 14½° below Zero, the bitumen of Bastenne and Gaujac, with which one side of the Pont Neuf at Paris is paved, was not at all im-

paired, and would, apparently, have resisted any degree of cold; while that in some parts of the Boulevard, which was composed of vegetable tar, cracked and opened in white fissures. The French Government, instructed by these experiments, has required, when any of the vegetable bitumens are laid, that the pavement should be an inch and a quarter thick; whereas, where the bitumen composed of mineral tar is used, a thickness of three quarters of an inch is deemed sufficient. The pavement of the bonding-warehouse at Bordeaux has been laid upwards of fifteen years by the Bastenne Company, and is now in a condition as perfect as when first formed. The reservoirs constructed to contain the waters of the Seine at Batignolles, near Paris, have been mounted six years, and notwithstanding the intense cold of the winter of 1837, which froze the whole of their contents into one solid mass, and the perpetual water pressure to which they are exposed, they have not betrayed the slightest imperfection in any point. The repairs done to the ancient fortifications at Bayonne, have answered so well, that the Government, two years ago, entered into a very large contract with the company for additional works, while the whole of the arches of the St. Germain and St. Cloud Railways, and the pavements and floorings necessary for these works, are being laid with the Bastenne bitumen.

The mineral tar in the mines of Bastenne and Gaujac is easily separated from the earthy matter with which it is naturally mixed, by the process of boiling, and is then transported in barrels to Paris or London, being laid down in the latter place to the company at 17*l*. per ton, in virtue of a monopoly of the article purchased by the company at a sum, it is said, of 8000*l*.

Mr. Harvey, the able superintendent of the Bastenne Company, was good enough to supply me with various samples of mineral tar, bitumen, and asphaltic rock for analysis. The tar of Bastenne is an exceedingly viscid mass, without any earthy impurity. It has the consistence of baker's dough at 60° of Fahrenheit; at 80° it yields to the slightest pressure of the finger;

at 150° it resembles a soft extract, and at 212° it has the fluidity of molasses. It is admirably adapted to give plasticity to the calcareous asphaltes.

A specimen of Egyptian asphalte which he brought me, gave, by analysis, the very same composition as the Val-de-Travers, namely, 80 per cent. of pure carbonate of lime, and 20 of bitumen. A specimen of mastich, prepared in France, was found to consist, in 100 parts, of 29 of bitumen, 52 of carbonate of lime, and 19 of silicious sand. A portion of stone called the natural Bastenne rock, afforded me 80 parts of gritty silicious matter, and 20 of thick tar. The Trinidad bitumen contains a considerable portion of foreign earthy matter; one specimen having yielded me 25 per cent. of silicious sand; a second, 28; a third 20; and a fourth, 30: the remainder was pure pitch. One specimen of Egyptian bitumen, specific gravity 1·2 was found to be perfectly pure, for it dissolved in oil of turpentine without leaving any appreciable residuum.

Robinson's Parisian Bitumen Company use a mastich made with the pitch obtained from boiling coal tar mixed with chalk. One piece laid down by this company at Knightsbridge and another at Brighton, are said to have gone to pieces. The portion of pavement laid down by them in Oxford-street, next Charles-street, has been taken up. Claridge's Company have laid down their mastich under the archway of the Horse-Guards, and in the carriage entrance at the Ordnance-office; the latter has cracked at the junction with the old pavement of Yorkshire curb-stone. The foot-pavement laid down by Claridge's Company at Whitehall has stood well. The Bastenne Company has exhibited the best specimen of asphalte pavement in Oxford-street; they have laid down an excellent piece of foot-pavement near Northumberland-house; a piece, 40 feet by 7, on Blackfriars-bridge; they have made a substantial job in paving 830 superficial feet in front of the Guard-room at Woolwich, which, though much traversed by foot-passengers, and beat by the guard in grounding arms, remains sound; lastly, the floor of the stalls belonging to the

cavalry barracks of the Blues at Knightsbridge, is probably the best example of Asphaltic pavement laid down in this country, as it has received no injury from the beating of the horses' feet.

As the specific gravity of properly made mastich is nearly double that of water, a cubic foot of it will weigh from 125 to 130 lbs.; and a square foot three quarters of an inch thick, will weigh very near eight pounds. A ton of it will, therefore, cover 280 square feet. The prices at which the Bastenne Bitumen Company sell their products, is as follows:—

Pure mineral tar, £24 per ton, or 28s. per cwt.
Mastich ...... 8 8s. ......10 ,,

			SIDE PAVEMENT.	ROOFS AND TERRACES.
From	50 to	100 feet,	1s. 3d. per foot	1s. 6d. per foot.
	100	250	1 1	1 4
	250	500	0 11	1 1
	500	750	0 10	1 0
	750	1000	0 9	0 11
	1000	2000	0 8	0 10
	2000	5000	0 7	0 9

Where the work exceeds 5000 feet, contracts may be entered into.

For filling up joints of brickwork, &c., from 1d. to 1¼d. per foot, run according to quantity.

These prices are calculated for half an inch thickness, at which rate a ton will cover 420 square feet.

As the Val-de-Travers Company engage to lay down their rich asphaltic rock in London at 5*l.* per ton, and as a mineral tar equal to that of Seissel may probably be had in England at one-fourth of the price of that foreign article, they may afford to lay their mastich three quarters of an inch thick per the thousand feet, including a substratum of concrete, at a rate of fivepence a square foot, instead of fifteenpence, being the rate charged under that condition by the Bastenne Company.

These charges are for London and its immediate vicinity.

13, Charlotte-street, Bedford-square,
April 22d, 1839.

REPORT OF THE EXPERIMENTAL PAVEMENTS LAID DOWN IN OXFORD-STREET, FROM CHARLES-STREET TO TOTTENHAM-COURT-ROAD, JANUARY, 1839.

1. Robinson's Parisian bitumen, laid in blocks 12 inches square and 5 inches deep; the substance is a compound of bitumen, lime, &c., and five granite stones are inserted in the top of each block; the work is laid in straight courses, the joints cemented with hot bitumen. The quantity of this is 97 square yards, the length is 20 feet, and the price, if adopted, 9s. per square yard.

2. Same as 1, but the courses laid diagonally. The quantity is 97 square yards, the length is 20 feet.

3. Granite paving, 9 inches deep, jointed with Claridge's asphalte, the work laid in straight courses. The cost to the parish has been 11s. 7d. per yard superficial for the stone and laying, &c., no charge being made by Claridge's Company for the asphalte. The quantity is 240 yards, the length 54 feet.

4. Granite paving, 4½ inches deep, jointed with Claridge's asphalte, the work laid in diagonal courses. Cost to the parish 9s. 6d. per square yard. No charge made for the asphalte. The quantity is 88 square yards, the length 20 feet.

5. The Bastenne Bitumen Company. The blocks are 12 inches long, 6¼ wide, and 3¾ deep, with bevelled joints, close at bottom, and ½ inch open at top; the joints cemented with hot bitumen; the substance is bituminous, with a very large proportion of granite imbedded in each block: the price, if adopted, 13s. 6d. per square yard; the length, in straight courses, 20 feet.

6. Same as 5, but the courses laid diagonally. The length 40 feet; the total quantity in 5 and 6 is 274 square yards.

7. Aberdeen granite paving, 9 inches deep; laid on a concrete bottom, formed of gravel and lime, the joints of the pavement run with hot lime grout, in straight courses. The length is 69 feet; cost, 16s. 5d. per square yard.

8. Same as 7, but the courses laid diagonally; length, 38 feet.

9. Aberdeen granite paving, 9 inches deep, in straight courses, without a concrete bottom; joints filled with fine gravel; cost, 12s. 5d. per yard; length, 24 feet.

10. The Scotch Asphaltum Company. The work is laid in

blocks of divers lengths, 9 inches wide, and 6½ deep; the side joints are straight, the end joints are bevelled alternately. The work is laid in straight courses, and jointed in Roman cement; the substance is, apparently, a bituminous matter mixed with fine gravel. The length is 50 feet: the number of square yards, 210; the price per yard, if adopted, 13s. 3d.

11. The wood paving. The blocks are sexagon on the plan, and (with the exception of a few courses that are only 8 inches), 12 inches deep. The work is laid endways of the grain; the blocks are mostly 8 inches diameter—a few courses are 7 inches. The material is Norway fir; there is no prepared bottom—the blocks are laid on the plain ground, a small layer of gravel being spread to bed them in. From the west end, 22 rows of courses of blocks are of wood in its natural state; 31 rows have been Kyanised; 9 rows at the eastern end have been dipped in Claridge's asphalte; 6 rows have been dipped in a solution prepared by the Patentee: the remainder are of wood in the natural state. The length of this piece is 60 feet: the number of yards, 230; price per yard, if approved, 10s. 6d.

12. Val-de-Travers Company. Blocks in straight courses, 12 inches square, 5 inches deep, with square joints. The substance of the blocks is bituminous, with a very large proportion of granite imbedded in each block, the joints cemented with hot bitumen. The length is 25 feet; number of square yards, 94; the work is performed gratuitously.

STATEMENT OF THE NUMBER OF CARRIAGES PASSING THROUGH OXFORD-STREET AT THE UNDER-NAMED TIMES AND PLACES.

Date 1839.	Time.	Place.	Gents. 2 wheel.	Gents. 4 wheel.	Omnibuses.	Hackney Carriages. 2 wheel.	Hackney Carriages. 4 wheel.	Stage Coaches.	Waggons, Drays, &c.	Lt. Carts & Sundries.	Total.
Jan. 16	6 in the morning till 12 at night.	by the Pantheon.	347	935	890	621	752	91	372	1507	5515
18	do.	by Stratford-pl.	254	603	1213	401	728	89	472	993	4753
22	do.	by Newman-st.	439	1241	1015	584	1288	85	958	1382	6992
26	do.	by Stratford-pl.	371	666	1337	542	762	92	881	1292	5943
26	12 at night till 6 in the morning.	do.	—	4	1	82	139	2	38	58	324

13. The same company. A layer of clean chippings and hot

asphalte poured thereon. The face up with hot asphalte and broken stone imbedded therein, The length is 25 feet: number of yards, 94; the work gratuitous.

14. Same as 9. The length 47 feet.

By order of the Committee.

H. KENSETT, Chairman.

REPORT OF TRANSACTIONS OF THE INSTITUTION OF CIVIL ENGINEERS.

(Continued from p. 201.)

Feb. 12, 1839.

The President in the chair.

Mr. Simpson presented some pieces of iron hooping which had been imbedded for twenty-six years in cement, and which were blue as when first put in; the iron hooping had been placed round stone pipes at their junction, and covered with cement. From these specimens, it is evident that a coating of cement is a perfect preventive of corrosion.

"On the Properties and Composition of the Peat and Resin Fuel." By C. Wye Williams, A. Inst. C.E.

The nature of the fuel being of great importance in the manufacture of iron and arts generally, it is interesting to inquire into the value of peat for these purposes. Peat may also be used for railroad engines, and with peculiar advantage, being free from many of the impurities of gas cokes: it may also be used in combination with resin, or other bituminous substances, as a fuel for long voyages. The bogs of Ireland were, nearly thirty years ago, designated by a Mr. Griffiths as mines above ground; who remarked, also, that the iron-founders in Dublin might probably, ere long, be supplied with turf charcoal, which is superior to every other for their purpose. The attention of the author was directed to the use of peat for the steamers on the Shannon, where coal is necessarily dear, and peat was at first used only

for economy; the impediments to its use, from its bulk and dampness, being great. The property of holding and absorbing moisture, is also a great impediment to its use, particularly in wet seasons, the only remedy for which is great care during the process of drying and in its subsequent preparation, any care being amply repaid by the diminished consumption. The evils of its bulk and low specific gravity may be obviated by compressing it when dry; when compressed perfectly dry, and kept free from moisture, it will preserve its bulk. From some observations of Tredgold, respecting the earthy impurities and odour of peat when burnt, it is obvious that he experimented on peats from the lower strata; but the author, in opposition to several eminent philosophers, maintains that turf coke may be made more effective than wood charcoal. The author, in his first experiments, came to the same conclusions for using the lower, though impurer, strata, simply because they were the denser, and rejecting the lighter kinds. The lower strata sometimes contains peat of a tolerable purity, but generally the upper and lighter portions are superior in the purity of the carbon, the intensity and quality of its heat, to those portions which have acquired density by time and natural pressure. When the density is acquired by artificial pressure, we have a substance superior to any other for all purposes of metallurgy.

The difficulty in the conversion of turf into coke has hitherto lain in depriving it of its volatile substances, so as to make a pure carbon, and in avoiding waste by partial combustion. This is effected by an union of the distillatory with the stifling process; the volatile substances are expelled in the oven, and when sufficiently charred the stifling process is adopted. Turf for the forge must have a greater density than that acquired by this process. This is effected by pulverising or bruising it, so as to destroy the fibrous character, and bring the component parts into closer and more permanent contact. By the union of these processes, any density may be given to the fuel which will combine the purity of vegetable charcoal with the density of mineral coke. The specific gravities of the turf hard pressed (water being 1000) is 1160—

of the coke from the hard pressed 1040. Thus, the hard pressed turf is denser than the densest wood, and the turf coke double the density of charcoal and equal to coal coke.

The test adopted by the author, after Berthier, of the calorific power, or relative power of absorbing oxygen, is the quantity of metallic lead reduced from its state of oxide by given weights of the several fuels. Pure carbon gives 340 grains, wood charcoal 307, turf coke 277, best coal coke 277.

Thus we have a measure of the relative quantities of heat; but intensity of heat is often of more consequence than quantity, and intensity depends on the density of the fuel. Berthier remarks, that the superiority of coke to wood charcoal is owing to its density. In the above comparison, no account is taken of the impurities of the fuels; consequently, turf coke, being free of sulphur, has great advantages. The author finds that iron worked with turf coke is sooner brought to a welding heat, works softer, and comparatively free from scales.

The author then describes the resin fuel as an artificial coal produced by imitating the process of nature, in the best combinations peculiar to coal. Natural pit coal consists of bituminous, carbonaceous, and various foreign ingredients, of which sulphur is in abundance, and very injurious. The resin fuel consists of resin, the purest available bitumen, and turf coke the purest vegetable carbon. Thus, the greatest heating power exists in the smallest bulk, and the excess of bitumen and deficiency of carbon, as in cannel coal, or excess of carbon and deficiency of bitumen, as in anthracite, may be avoided. Resin, notwithstanding its price, is used in steam navigation, but very disadvantageously, in combination with cinders, as it melts and passes off in a state of vapour, not entering readily into combustion with the oxygen of the atmosphere. But in the resin fuel, in consequence of the extraordinary attraction which subsists between carbon and oxygen, the resin has its full combustible and calorific effect. In the furnaces of boilers, a solid cinder is requisite, which may be produced by adding some of the inferior bitumen, as pitch and tar. The fuel is manufactured by adding

turf coke in a state of powder to the bitumen in a melting state, and in such quantities as to saturate each other. The average price of fuel is 40s. per ton. Its use was fully tested in the voyages of the Royal William, in which 20 cwt. of coal, with 2 cwt. of the fuel, did the work of 26 cwt. of coal. The suddenness of the action, and the great increase of heat for a small increase in its consumption, render it of great value in cases of emergency. The author concludes by expressing his conviction, after ten years' experience, that the turf bogs of Ireland may be rendered available for many important uses in the arts.

Mr. Lowe called the attention of the meeting to the valuable mass of facts which had recently been recorded. It was on these that the chemist must build his theory of combustion, and not strain his theory to the facts. We cannot doubt the facts of Apsley Pellatt and Josiah Parkes; men of undoubted acuteness and close observation, and not to be deceived. Marcus Bull again, under totally dissimilar circumstances, viz., the raising by 10 deg. the temperature of a chamber, exquisitely insulated, and observing how long it can be maintained at this temperature by a given weight of different fuels; and accurately noting the loss sustained by the wood in the process of coking, came to similar results. With respect to shell bark hiccory, whose specific gravity is the same as that of water, and loses three-fourths of its weight by coking, Marcus Bull finds that equal heat is produced by $6\frac{3}{8}$ lbs. of hiccory charcoal, and by 15 lbs. of dry wood. So that we may say a given weight of the dry wood produces just double the effect it would if made into charcoal.

There is clearly something in coal and wood whose action is not beneficial, as the residual coke does, according to these three men, produce the same effect as the original weight of fuel. The *resumè* of these experiments shows, that to deprive bituminous coal of certain portions of oxygen, carbon, and hydrogen, is not to depreciate its heating powers; according to Mr. Williams' experiments we find, that to add a bituminous substance to a pure coke or carbon, is greatly to increase its heating power. It is fearful to

think how often we are self-deceived; men do so lean to their preconceived notions and to their wishes. He could almost always get a yea or a nay indifferently from his workmen. The person who would not be deceived, and rightly study the laws of combustion, must himself turn stoker.

To say that no heating powers are given off by the process of coking, would be just as absurd as to give credence to the statements that every thing can be done by coke ovens. This is proved by the statements of Mr. Cubitt, in the first volume of the Transactions, who applied, at Ipswich, the waste heat of coke ovens to heating gas retorts; and the same is still done at Reading. Whether the coke it produces is equally good with that made in the usual routine, remains to be proved. But to say that the 15 cwt. of coke, produced from a ton of coal, is equal in heating powers to the original ton, is to say that there were no heating powers from the 9 or 10,000 cubic feet of gas produced, or the 10 gallons of tar. The contrary is self-evident, and the whole mystery is cleared up by supposing that in the ordinary routine of furnaces, most of the bituminous and gaseous products pass up the chimney, asking for heat rather than giving any off.

Mr. Horne particularly called attention to the fact mentioned by Mr. Williams of the fibre being broken down. Most experiments on compression had failed from this having been neglected.

Mr. John Taylor had for seven years worked coke ovens for the purpose of distilling wood. Several tons of coal were coked every week, and three large retorts, 6 feet by 8, were worked. The heat of one coke oven was effective for four of these retorts, and the coke sold for the cost of the coal. Here there was clearly an available heat. There is great difference in the mode in which fuel is employed; coke is peculiarly valuable in a locomotive, because of the draught: the bituminous coal of North Wales is bad for steam engines, as compared with the coal of South Wales. Of this he knew a striking instance. Soon after Messrs. Grose had erected, in Cornwall, their famous 80 million engine, one in every respect similar was erected in North Wales. A duty of 70 or 80 millions was expected: it never rose above 45 deg. They tried

some Swansea coal; the duty immediately reached 70 millions. The bituminous effect of the North Wales coal is lost—it distils off; and this is shown by the fact, that when fresh coal is thrown into the furnaces in North Wales a cloud of smoke issues from the chimney, but in Cornwall no smoke is visible.

They once had occasion to try wood, and the hot blast which succeeds so well with coke will not do with wood, and in all the metallurge process the wood must be coked. Turf charcoal has, to his knowledge, been in use at Dartmoor for forty years. For welding, and all fine works, it is the best. Peat has been most extensively used in the North for smelting lead ore; now a small quantity of coal is mixed with it. He had used peat in a reverberatory furnace for calcining lead ore, and for this purpose dry peat, with a small mixture of coal, is very valuable. Could a cheap and simple process be employed for expressing, the water peat would be an extremely valuable fuel.

Mr. Cottam stated, that he had two years ago built a coke oven for coking two chaldrons at a time. A boiler was placed above it from which the steam engine was worked. The coke from under the boiler did not make as much iron as other coke. When the boiler was placed by the side more fuel was required, but a better coke was produced. Good coke requires a reflected heat, and that produced in an oven of good fire-brick will produce a better charge than the coke from any retort.

SOCIETY FOR THE ENCOURAGEMENT OF ARTS, MANUFACTURES, AND COMMERCE,

Adelphi, June 10, 1839.

HIS ROYAL HIGHNESS THE DUKE OF SUSSEX, PRESIDENT.

THE REWARDS ADJUDGED BY THE SOCIETY DURING THE PRESENT SESSION.

IN MECHANICS AND OTHER PRACTICAL ARTS.

To Mr. J. T. Cooper, Polytechnic Institution, Regent-street, for his method of preparing paper for photographic drawing, the silver medal.

To Mr. R. Redman, Great Wild-street, Lincoln's-inn-fields, for his method of making transfers from copper-plate printing to zinc or stone, the silver Isis medal and 5*l.*

— Mr. H. C. Page, Commercial-road, Pimlico, for his method of lettering on polished marble, the silver medal.

— Mr. W. H. Thornthwaite, James-place, Hoxton, for his apparatus for the use of divers, the silver medal.

— Mr. W. Jones, Horseshoe-court, Ludgate-hill, for his travelling platform, the silver Isis medal.

— Mr. M. Jennings, Portsmouth-street, Lincoln's-inn-fields, for his night signals for steamers, the silver Isis medal.

— Mr. James Hopkins, Globe Brewery, King's-row, Horselydown, for his scale lever, the silver Isis medal.

— Mr. Benjamin Holmes, clerk of the works at Chatsworth, for his spring-bolt plate, the silver Isis medal.

— Mr. J. Gray, Old Burlington-street, for his improved instruments for extracting teeth, the silver medal.

— Mr. A. Wivell, Cardington-street, Hampstead-road, for his fire-escape, the silver medal.

— Mr. Jos. Jeay, Oxford-market, for his method of determining the lengths and bevels of timbers in a hip roof, the silver Isis medal.

— Mr. C. Hanshard, Sebright-street, Bethnal-green, the silver Isis medal and 5*l.*

— Mr. Jas. Cole, Sebright-street, Bethnal-green, 5*l.*

— Mr. J. Sodo, Sebright-street, Bethnal-green, 5*l.* For their respective shares in the invention of the tube used in weaving wide silk velvet.

— Mr. J. Dove, Surat-place, Green-street, Bethnal-green-road, for his improved machine for weaving silver tissue, the silver Isis medal and 10*l.*

THE THANKS OF THE SOCIETY HAVE BEEN VOTED TO

Mr. J. C. Bowles, Cannon-street, for his apparatus for raising empty casks, and for his improved put-log for building scaffolds.

Mr. G. Aikin, Took's-court, Carey-street, for his paper on the recent agricultural improvements in the Fen district.

Mr. W. Buchanan, of Chalk-lodge, Cheshunt, for certain new varieties of the potatoe.

Mr. J. L. Fenner, King's-row, Pentonville, for his method of exhausting the cupping-glass.

Mr. J. Marsh, Royal Arsenal, Woolwich, for his test for acids and alkalies prepared from the petals of the red dahlia.

ORIGINAL DRAWINGS.

To Mr. J. H. Taunton, New Hall-street, Birmingham, for a drawing from measurement of a steam turning-lathe, the silver medal.

— Mr. Joel F. Earle, Bellevue-terrace, Hull, for a drawing in Indian ink of the interior of Trinity Church, Hull, the silver medal.

— Mr. J. Clayton, Hunter-street, Brunswick-square, for an original design for a steam-packet wharf, the silver medal.

— Mr. Allan Bailey, Lower Brook-street, Ipswich, for an original design for a mercantile exchange, the Stock gold medallion.

— Mr. Robert W. Billings, Manor-house, Kentish-town, for his analysis of the great east window of Carlisle Cathedral, the Acton gold medallion.

List of Patents

Granted by the French Government from the 1*st of April to the* 30*th June*, 1838.

(Continued from p. 202.)

To Alexandre Edouard Baudrunout, of Paris, for improvements in machines used for the manufacturing of barrels and other articles composed of staves bound by hoops.

— Jean Robert Bréant, of Paris, for a means of penetrating wood with a substance capable of preserving it from dry rot, worms, &c.

— Desbassyns de Richemont, of Paris, for a new method of employing the flame produced by the combustion of certain gases.

— Victor Jean Martin Robin, of Niederbronn, for a means of consuming, in blast or other furnaces, the gases not burned or

decomposed, and generally allowed to escape by the mouth of such furnaces.

To Jean Simon Demielle, of Paris, for an apparatus for filtering water and other liquids.

— Placid Justin, of Paris, for a new method of taking castings from type, so as to apply a cylindrical rotary press to typographic printing.

— Augustin Picard, Jules Duchesne, and Jean Daniel Calladon, of Avignon, for an apparatus and a process applicable to the drying of madder.

— Jean Baptiste Gautherin and Pierre Fol, of Bordeaux, for a boat with inclined planes, for navigating upon rivers, canals, and streams, either by means of steam or animal force.

— Magloire Roux, of Paris, for the composition of a *vegeto-mineral bitumen.*

— Théodore Rose Léon Alfred Sudre, of Paris, for a new process of casting type for printing.

— Elie Paris, of Paris, for a new mode of producing gas light by the distillation of resin or oil.

— Joseph Antoine Lesneur, of Paris, for the fabrication of an artificial building stone.

— Pierre Alexandre de Martigny des Roches, of Paris, for substituting wick-work in various constructions where solid wood is generally used.

— Antoine Remy Polonceau, of Paris, for an improved method of making asphaltic roads and pavements.

— Joseph Tardy, of Dijon, for a new manner of making hogsheads.

— Antoine Dugnet, of Lyons, for a new means of grinding olives.

— François Paulin Terzuolo, for a new mechanical printing press.

— Pierre Champonnois, of Beaune, for a moveable suspension-bar, for rivers, to assist navigation, or to irrigate lands.

— François Théodore Guibert, of Paris, for a new bitumen called *asphalte Guibert.*

— Joseph Raymond, of Paris, for an improved steam-boat.

To Auguste Boulan and Narcisse Martin, of Paris, for a machine for excavating the earth, and removing the soil thus loosened.

— Neville, Nash and Co., of Turin, for divers machines for facilitating the working of raw silks.

— Livenais, jun., of Nantes, for a new process of extracting carburated hydrogen gas.

— Jean Antoine Sechot Poncet, of Paris, for a machine for paring skins.

— Belegnie, of Quimper, for improved shrouds and rigging.

— Pierre Bernardet, of Paris, for a new kind of soap.

— François Joseph Imbs, of Strasbourg, for a means of employing the refuse silk in the manufacturing of hosiery.

— Jean Jacques Joseph Le Roy, of Paris, for a gas generator, to be used as a substitute for ordinary steam boilers.

— Charles Gabriel Pravaz, of Paris, for a new rotary steam engine.

— Pierre Joseph Meens, of Brussels, for the manufacturing of wadded fabrics.

— Joseph Teissier, of Paris, for improvements in safety locks and bolts.

— Marquis de Louvois, peer of France, of Paris, for a railroad with a single rail, with double waggons.

— Edouard Geerts, of Paris, for a fire-safe.

— Count Louis Jelski, of Paris, for the application of a system patented in Belgium, to the construction of axletrees.

— Michel Plummer, of Pont Andemer, for a machine for splitting hides.

— Neville, Nash and Co., of Turin, for a new system of construction for bridges and scaffolding of great extent.

PATENTS FOR TEN YEARS.

To Jean Baptiste Lebeau, of the Château de Godet, represented in Paris by M. Perpigna, advocate of the French and Foreign Office for Patents, Rue de Choiseul, for a machine for excavating the earth, and applicable to the construction of railroads, the confection of canals, and the levelling of grounds.

— Christian Nielsen, represented in Paris by M. Perpigna, for an improved method of making bread.

To Aman Sylvestre, represented in Paris by M. Perpigna, for an instrument for taking the exact measure of persons.

— Witz, Koenig, and Dupasquier, of Neufchatel, represented in Paris by M. Perpigna, for a mechanical system applicable to calico-printing machines, and dispensing with the boy generally employed.

— Amedée François Rémond, and François Gaëtan, of Orleans, represented in Paris by M. Perpigna, for a brick-making machine.

— Louis Victor Hutmot, of Compiegne, represented in Paris by M. Perpigna, for a new kind of umbrella.

— Guittard, Sons, and Co., of St. Pons, for an apparatus called *regulator*, by means of which the motion of a water wheel is maintained uniform.

— Auguste Etienne Cepdeville, of Paris, for improvements in the boiling and concentrating of glue and gelatinous substances.

— John Houston, of Rouen, for a new method of distributing steam in high-pressure engines.

— Jean Georges Biwer, of Paris, for a new lock.

List of Patents

Granted in Scotland between 22d May and 23d June, 1839.

To Joseph Amesbury, of Burton-crescent, St. Pancras, surgeon, for a certain apparatus as an improvement or improvements in apparatus for the support of the human body.—24th May.

— John Henfrey, of Weymouth-terrace, London, engineer, for certain improvements in the manufacture of hinges or joints, and in the machinery employed therein.—29th May.

— John Boyd, of College-street South, and Hugh Francis Rennie, of Glengall-street, Belfast, flax-spinners, for certain improvements upon the spinning frame used for spinning flax, hemp, and tow, upon the wet principle.—29th May.

— John Williamson Whittaker, of Bolton, joiner, and Rowland Hall Heaton, cotton spinner there, for certain improvements

in the means of connecting or uniting straps or bands for driving machinery and other similar purposes, and in the apparatus for effecting the same.—30th May.

To James Drew, of Manchester, civil engineer, for certain improvements in the means of consuming smoke and economizing fuel in steam-engines, or other furnaces or fire-places.—31st May.

— John George Bodmer, of Manchester, engineer, for certain improvements in the machinery or apparatus for carding, drawing, roving, and spinning cotton, wool, flax, and other fibrous substances.—5th June.

— Edward Pearson Tee, of Barnsley, dyer, for improvements in weaving linen and other fabrics.—6th June.

— William Hickling Burnett, of Wharton-street, London, for improved machinery for cutting or working wood.—12th June.

— John Roberts, of Manchester, machine-maker, for certain improvements in machinery or apparatus for planeing or cutting metals.—14th June.

— George Nelson, of Leamington Priors, Warwickshire, for a certain new or improved method, or new or improved methods of preparing gelatine, which has the properties of, or resembles glue.—17th June.

— William Morgan, of New Cross, London, for improvements in the generation of steam.—17th June.

— William Whittam, of Huddersfield, machinist, for improvements in engines to be worked by steam, water, or other fluids.—17th June.

— Alexander Frances Campbell, of Great Plumstead, Norfolk, and Charles White, of Norwich, mechanic, for certain improvements in ploughs, harrows, scarifiers, cultivators, and horse-hoes.—17th June.

— Charles Andrew Caldwell, of Audley-square, London, communicated by a foreigner, for improvements in furnaces and apparatus for applying the heat of fuel.—18th June.

New Patents

SEALED IN ENGLAND.

1839.

To Alexander Gordon, of Fludyer-street, Westminster, engineer, for an improved machine or apparatus for employing steam or other elastic fluid as a motive power.—Sealed 30th May—6 months for inrolment.

To William Armstrong, of Hawnes, near Ampthill, Bedford, farmer, for improvements in harrows.—Sealed 30th May—6 months for inrolment.

To William Palmer, of Sutton-street, Clerkenwell, manufacturer, for improvements in lamps and in the manufacture of candles.—Sealed 1st June—6 months for inrolment.

To Stephen Geary, of Hamilton-place, King's-cross, architect, for certain improvements in paving or covering streets, roads, and other ways.—Sealed 1st June—6 months for inrolment.

To Josephine Julie Besnier de Bligney, of the Commercial Hotel, Leicester-street, Leicester-square, for improvements in umbrellas and parasols.—Sealed 3d June—6 months for inrolment.

To John Bradford Furnival, of Street Ashton, Warwick, tanner, for improvements in apparatus or material to prevent persons sinking when in the water.—Sealed 4th June —6 months for inrolment.

To Moses Poole, of Lincoln's-inn, gentleman, for improvements in the manufacture of soap, by the application of materials not hitherto used for that purpose.—Sealed 4th June—6 months for inrolment.

To William Bates, of Leicester, manufacturer, for improvements in the process of finishing hosiery and other looped fabrics.—Sealed 4th June—6 months for inrolment.

To Christopher Nickels, of Guildford-street, gentleman, and John Danforth Greenwood, of the Belvidere-road, manufacturer, both in Lambeth, for improvements in producing plain and ornamental articles and surfaces from cements or earths, separately, or combined with other materials.—Sealed 4th June—6 months for inrolment.

To Joshua Procter Westhead, of Manchester, for an improvement or improvements in the manufacture or construction of stays or corsets.—Sealed 4th June—6 months for inrolment.

To William Prior, of Royal-street, in the borough of Lambeth, gentleman, for certain improvements in the carriages and axletrees of wheel carriages.—Sealed 6th June—6 months for inrolment.

To Arthur Parsey, of the Quadrant, Regent-street, artist, for improvements in obtaining motive power.—Sealed 6th June—6 months for inrolment.

To Harrison Grey Dyar, of Regent-street, gentleman, and John Chrisholm, of Pomeroy-street, Old Kent-road, manufacturing chemist, for improvements in obtaining sulphur from pyrites, or certain native sulphuretts.—Sealed 6th June—6 months for inrolment.

To Charles Andrew Caldwell, of Audley-square, Esq., for improvements in furnaces and apparatus for applying the heat of fuel.—Sealed 6th June—6 months for inrolment.

To Baron Henry de Bode, of Great Portland-street, Cavendish-square, for improvements in the means of rendering magnetic needles less prejudicially influenced by local attraction, which improvements are applicable to other magnetic objects for the same purpose.—Sealed 8th June—6 months for inrolment.

To Francis Vouillon, of Princes-street, Hanover-square, for improvements in the manufacture of ornamental woven fabrics.—Sealed 8th June—6 months for inrolment.

To Goldsworthy Gurney, of Bride, in the county of Cornwall, Esq., and Frederick Rixon, of Cockspur-street, Pall-mall, for improvements in the apparatus for producing and distributing light.—Sealed 8th June – 6 months for inrolment.

To Moses Poole, of Lincoln's-inn, gentleman, for improvements in printing calicoes and other fabrics.—Sealed 11th June—6 months for inrolment.

To Charles Chubb, of St. Paul's Church-yard, London, and Jeremiah Chubb, of Red Lion-street, Clerkenwell, mechanist, for improvements in apparatus and machinery for preserving books and other papers, documents, and articles from fire.—Sealed 11th June—6 months for inrolment.

To William Harves, of Old Barge-house, Christ Church, soap-manufacturer, for improvements in the manufacture of soap, parts of which improvements are applicable to preparing tallow for the manufacture of candles.—Sealed 12th June—6 months for inrolment.

To William Grannsel, of South Lincoln, machine-maker, for improvements in apparatus for drilling corn, grain, pulse, and manure.—Sealed 12th June—6 months for inrolment.

To Nicholas Harvey, of Hayle, Cornwall, and William West, of St. Blazey, in the same county, mechanist, for an improved valve for machines for raising water and other liquids.—Sealed 12th June—2 months for inrolment.

To William Watson, of Temple-street, Dublin, gentleman, for an improvement in the construction of ships, and which improvement is also applicable to all kinds of seagoing vessels, and also certain improvements in the construction of boats and other vessels intended to be used on canals and inland navigations.—Sealed 12th June—6 months for inrolment.

To William Newton, of the Office of Patents, Chancery-lane, civil-engineer, for an improved medicinal compound or ferruginous preparation to give tone and vigour to the human system, particularly applicable in cases of weak digestion, and in the diseases called chlorosis.—Sealed 12th June—6 months for inrolment.

To Joseph Sanders, Burton-upon-Trent, Stafford, gentleman, for an improved lock and key.—Sealed 12th June—2 months for inrolment.

To Edward Loos, of Air-street, Piccadilly, chemist, for improvements in extracting the saccharine matters from sugar canes, and other substances of a saccharine nature; which improvements are also applicable in extracting colouring matters from wood and other matters used in dyeing.—Sealed 17th June—6 months for inrolment.

To Alexander Francis Campbell, of Great Plumstead, Norfolk, Esq., and Charles White, of the city of Norwich, mechanic, for improvements in ploughs, harrows, scarifiers, cultivators, and horse-hoes.—Sealed 17th June—6 months for inrolment.

To Richard Beard, of Egremont-place, New-road, gentleman, for improvements in printing calicoes, and other fabrics.—Sealed 17th June—6 months for inrolment.

To Bryan I'Anson Bromwich, of Clifton and Tone, Worcester, gentleman, for improvements in machinery to be worked by the application of the expansive force of air or other elastic fluids, to obtain motive power.—Sealed 17th June—6 months for inrolment.

To Henrick Gander, of North-street, Sloane-street, gentleman, for improvements in steam engines, steam boilers, and condensers.—Sealed 17th June—6 months for inrolment.

To Henry Le Messurier, of St. Peter Port, Guernsey,

master plumber, for improvements in pumps.—Sealed 17th June—6 months for inrolment.

To John Lee Benham, of Wigmore-street, ironmonger, for an instrument or apparatus for correctly ascertaining the number of passengers conveyed in omnibuses, and other public carriages.—Sealed 18th June—6 months for inrolment.

To John Wright, of Park-place, Glasgow, for certain improvements in mixing or alloying iron with other metals, for the purpose of increasing its strength, tenacity, or cohesion; which alloys, among many other uses, are particularly applicable to the construction or manufacture of links for chains, and rings, and certain machinery for effecting such manufacture.—Sealed 18th June—6 months for inrolment.

To Ambrose Bowden Johns, of Plymouth, artist, for improvements in colouring or painting walls and other surfaces, and preparing materials used for that purpose.—Sealed 19th June—6 months for inrolment.

To Peter Lomax, of Bolton-le-Moors, weaver, for certain improvements in looms for weaving.—Sealed 19th June—6 months for inrolment.

To John Wertheimer, of West-street, Finsbury-circus, for certain improvements in preserving animal and vegetable substances and liquids.—Sealed 20th June—6 months for inrolment.

To Charles Wye Williams, of Liverpool, gentleman, for certain improvements in boilers and furnaces designed to economize fuel and heat.—Sealed 22d June—6 months for inrolment.

To Henry Wilkinson, of Pall-mall, gunmaker, for an improvement in fire-arms.—Sealed 22d June—6 months for inrolment.

To Joseph Pons, of Union-crescent, New Kent-road,

gentleman, for an improved process of hardening wood and iron, and rendering wood repulsive of vermin, and proof against dry-rot.—Sealed 22d June—6 months for inrolment.

To Matthew Punshon, of Norfolk-street, Blackwall, engineer, for an improved steam engine, certain parts of which improved steam engine are applicable to steam engines on the ordinary construction.—Sealed 22d June—6 months for inrolment.

George Calder, of Fen-court, Fenchurch-street, for certain improvements in stoves or apparatus for roasting, baking, or cooking, which he intends to denominate a plantanum roaster.—Sealed 22d June—6 months for inrolment.

To Frederick Parker, of New Gravel-lane, Shadwell, animal charcoal manufacturer, for improvements in revivifying or reburning animal charcoal.—Sealed 22d June—4 months for inrolment.

To Wilton George Turner, of Parker-village, Regent's-park, doctor in philosophy, and Hebert Minton, of Longfield-cottage, Stoke-upon-Trent, in the county of Stafford, manufacturer, for an improved porcelain.—Sealed 22d June—6 months for inrolment.

To Luke Hebert, of Birmingham, civil-engineer, for apparatus for producing and communicating artificial light.—Sealed 22d June—6 months for inrolment.

To John Alexander Philip de Val Marino, of Margaret-street, Cavendish-square, Esq., for certain improvements in the manufacture of gas, and in the apparatus employed for consuming gas for the purpose of producing light.—Sealed 22d June—6 months for inrolment.

To Edward Brown, of Whiterock, Glamorgan, copper-smelter, for a new principle to be applied in the roasting and refining of copper, whereby the oxidation of the metal

is reduced, and the same is rendered more pure and ductile. —Sealed 22d June—6 months for inrolment.

To Joseph Jennings, of Bessow-bridge, Cornwall, assay-master, for a process of obtaining metal from pyrites or mundic.—Sealed 22d June—6 months for inrolment.

To William Vickers, of Firs Hill, Sheffield, steel manufacturer, for an improvement in the manufacture of cast steel.—Sealed 25th June—6 months for inrolment.

To John Arrowsmith, of Bilston, Stafford, civil engineer, for certain improvements in steam engines.—Sealed 25th June—6 months for inrolment.

To John Bingham, of Sheffield, manufacturer, and John Amory Boden, of the same place, manufacturer, for certain improved compositions which are made to resemble ivory, bone, horn, mother-of-pearl, and other substances applicable to the manufacture of handles of knives, forks, and razors, pianoforte keys, snuff-boxes, and various other articles.—Sealed 26th June—6 months for inrolment.

To Claude Schroth, of Leicester-square, gentleman, for certain improvements in the process, manner, or method of embossing or producing raised figures, designs, or patterns on leather or such like materials, and in the manner or means used for effecting the same; also in the making or forming of certain tools or apparatus used therein.—Sealed 26th June—6 months for inrolment.

To Pierre Auguste Ducote, of St. Martin's-lane, for certain improvements in the art of printing on paper, calicoes, and silks, and other fabrics.—Sealed 26th June—6 months for inrolment.

To William Newton, of the Office for Patents, Chancery-lane, civil-engineer, for certain improvements in the construction of sun-dials, designed to show mean time.—Sealed 27th June—6 months for inrolment.

CELESTIAL PHENOMENA, for July, 1839.

D.	H.	M.	
1			Clock before the sun, 3m. 19s.
—			☽ rises 10h. 56m. A.
—			☽ passes mer. 3h. 33m. M.
—			☽ sets 8h. 37m. M.
	22	25	♅ in conj. with the ☽ diff. of dec. 0. 42. S.
	23	8	♃ □ ☉
2			Gambart's Comet R. A. 5h. 59m. dec. 22. 16. N.
3	17	43	☉ in Apogee.
4	1	9	☿ greatest Hel. Lat. N.
	5	14	☽ in □ or last quarter.
	23	20	Juno □ ☉
5			Clock before the sun, 4m. 3s.
—			☽ rises 11h. 50m. A.
—			☽ passes mer. 6h. 43m. M.
—			☽ sets 2h. 14m. A.
6			Gambart's Comet R. A. 6h. 20m. dec. 21. 35. N.
			Ditto passes mer. 23h. 23m.
	17		☽ in Perigee.
8	2	9	Ceres □ ☉
10			Clock before the sun, 4m. 52s.
—			☽ rises 2h. 33m. A.
—			☽ passes mer. 11h. 40m. M.
—			☽ sets 8h. 36m. A.
			Gambart's Comet R. A. 6h. 41m. dec. 20. 45. N.
			Ditto passes mer. 23h. 28m.
	11	1	Ecliptic conj. or ● new moon.
11	16	2	☿ in conj. with the ☽ diff. of dec. 1. 46. S.
12	8	15	♂ in the descending node.
14	2	23	♀ in conj. with the ☽ diff. of dec. 0. 10. S.
15			Clock before the sun, 5m. 31s.
—			☽ rises 9h. 14m. M.
—			☽ passes mer. 3h. 50m. A.
—			☽ sets 10h. 10m. A.
16			Mercury R. A. 9h. 1m. dec. 18. 27. N.
—			Venus R. A. 10h. 41m. dec. 9. 1. N.
—			Mars R. A. 12h. 37m. dec. 4. 5. N.
—			Vesta R. A. 9h. 20m. dec. 19. 17. N.
—			Juno R. A. 0h. 58m. dec. 6. 43. N.
—			Pallas R. A. 13h. 19m. dec. 18. 23. N.

D.	H.	M.	
16			Ceres R. A. 13h. 16m. dec. 0. 14. S.
—			Jupiter R. A. 12h. 42m. dec. 3. 15. S.
—			Saturn R. A. 16h. 10m. dec. 19. 10. S.
—			Georg. R. A. 23h. 10m. dec. 6. 11. S.
—			Mercury passes mer. 1h. 27m.
—			Venus passes mer. 3h. 6m.
—			Mars passes mer. 5h. 2m.
—			Jupiter passes mer. 5h. 7m.
—			Saturn passes mer. 8h. 33m.
	23	30	♂ in conj. with the ☽ diff. of dec. 2. 13. N.
17	1	43	♃ in conj. with the ☽ diff. of dec. 3. 45. N.
18			Gambart's Comet R. A. 7h. 22m. dec. 18. 53. N.
			Ditto passes mer. 23h. 38m.
	3	2	☽ in □ or first quarter.
	18		☽ in Apogee.
19	9	46	♂ in conj. with ♃ diff. of dec. 1. 29. S.
20			Clock before the sun, 5m. 57s.
—			☽ rises 3h. 15m. A.
—			☽ passes mer. 7h. 18m. A.
—			☽ sets 11h. 13m. A.
	1	48	☿ in conj. with Vesta, diff. of dec. 2. 41. S.
	22	35	Juno in the descending node.
21	11	24	♄ in conj. with the ☽ diff. of dec. 6. 58. N.
22			Gambart's Comet R. A. 7h. 42m. dec. 17. 18. N.
			Ditto passes mer. 23h. 42m.
23	19	4	♀ in the descending node.
25			Clock before the sun, 6m. 9s.
—			☽ rises 8h. 6m. A.
—			☽ passes mer. 11h. 44m. A.
—			☽ sets 2h. 12m. M.
26			Gambart's Comet R. A. 8h. 2m. dec. 15. 53. N.
			Ditto passes mer. 23h. 46m.
	11	26	Ecliptic oppo. or ○ full moon.
27	12	58	☿ in the descending node.
	14	40	♀ greatest elong. 45. 42. E.
29	3	32	♅ in conj. with the ☽ diff. of dec. 0. 51. S.
	9	9	♃'s first satt. will em.

J. LEWTHWAITE, Rotherhithe.

THE

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CONJOINED SERIES.

No. LXXXIX.

Recent Patents.

To Charles Wye Williams, *of Liverpool, in the county of Lancaster, gentleman, for his invention of certain improvements in the means of preparing the vegetable material of peat moss or bog, so as to render it applicable to several useful purposes, and particularly for fuel.*— [Sealed 26th July, 1838.]

My invention consists, firstly, in a novel or peculiar mode, not hitherto practised, of manufacturing coke from peat moss or bog earth (which I will hereafter call peat), either before or after pressure, and by which I am enabled to produce peat cokes of different densities, suited to a variety of useful purposes; secondly, in incorporating such peat coke with bituminous matter of various kinds, by which an artificial coal is produced of great hardness and great heating powers, and which is peculiarly applicable to steam navigation and other purposes; and thirdly, in a

mode of rendering peat moss of great value in the process of converting coal into coke, and by which the value of such coke is greatly enhanced.

In order to afford the best information for carrying my inventions into effect, I give the following description of the process and means which I employ; namely, I take the dry peat, as now usually prepared for sale, in brick-shaped pieces, and subject it to a high degree of pressure under an hydraulic screw, or other press, by which it will be reduced to half or one-third of its previous bulk; thus rendering it more suitable as a fuel for the furnaces of steam-boilers, or for the purposes of the forge. This process is effected by having the press enclosed by iron or strong timber sides and ends forming a box round the press so as to confine the peat under the press.

My mode or process of converting such peat, either before or after such pressure, into coke, is effected by means of a vertical stove or oven of the following description:—Fig. 1, Plate XIII., is an elevation, and fig. 2, a plan, showing a cross partition of brick forming four distinct fire-places: A, is the body of the stove, made of plate-iron or bricks, or other suitable material; this stove may be about ten feet high and four feet wide: B, is the door by which the stove is charged with peat; C, the door by which the coke is withdrawn; D, D, D, pipes about three feet high and four inches in diameter, by which the vapour and volatile matters are allowed to escape during the process; E, E, are several holes of an inch in diameter about the centre of the stove, and by which the atmospheric air is to be admitted at the proper part of the process. These holes are to be provided each with an iron stopper. I have found sixteen or eighteen holes sufficient for this sized stove: F, F, F, F, four close-fitting iron doors, about six inches square, placed at the centres of the four triangular fire compartments

H, H, H, H, as seen at fig. 2, each door having three or four inch holes in the same for the admission of air, to maintain the required temperature and combustion when the four doors are closed; I, is an iron plate, which lays close on the cross brick partitions K, which divides the space below it into four equal sized fire chambers. This plate is perforated with holes, to allow the heat to pass upwards, yet preventing the peat placed above from pressing down on the fire to be lighted beneath in the four chambers H, H, H, H. These chambers are formed by the cross partition K, of brick, six inches high, and so constructed that no communication may take place between them.

The object of these divisions is to enable the operator, by closing one or more of the four iron doors, to give any required direction to the heat in the stove above, so that the whole body of the peat shall be uniformly coked. The operation of this stove is as follows:—The body of the stove being filled with the peat to be coked, a fire of shavings or other fuel is to be lighted in the four triangular chambers. The holes at E, and the doors B, and O, being all closed. On the fires being well lighted, the four doors F, F, F, F, are to be closed, as the air, which will then pass through the holes in such doors, will be sufficient for the required purpose. During this part of the process, care is to be taken to have a uniform heat on all sides of the stove, and which is to be effected by opening or shutting these holes. After the lapse of about one or two hours, and when the heat of the lower half of the stove is sufficiently strong (and which a little practice will soon point out), the holes in these lower doors are to be closed, and all admission of air by them, or the doors, is to be completely prevented by raising a mound of sand or earth round the bottom of the stove, sufficiently high to cover the four doors.

The stoppers of the holes at the middle belt at E, are

then to be taken out. By these holes, a sufficiency of air will be introduced to carry on the distillatory process of expelling the gases, the heat which the peat in the lower half of the stove has acquired, being sufficient to coke that which is in the upper half.

When the vapour and gases are sufficiently expelled by the funnels at D, these funnels, and the centre holes at E, are all to be closed air tight. The air being thus effectually excluded in all directions, the whole is to be thus stifled and allowed to cool, which will take about twelve hours to effect: when completely cold, and not sooner, the peat coke may be withdrawn through the door C. By this means a tolerably condensed coke is produced, which is applicable to many useful purposes where a more dense solid coke is not required, as for the use of open forges, heating boiler plate furnaces, and also for locomotive engines.

The following is a description of another kind of stove, which I have found useful in this coking process, and particularly for converting into coke the hard cakes of peat as compressed by the process detailed in my former patent, for preparing peat moss, and rendering it fit for the purposes of fuel, dated 11th November, 1837, and by which I am enabled to produce a dense, hard, shining coke, of a specific gravity greater than that of water or coal coke, and which is double that of charcoal: A, is the body of the stove, which is set horizontally; B, is the air pipe; C, the fire-place; D, the ash-pit; E, the funnel; F, escape pipes, for the vapour and gases; G, entrance aperture for the atmospheric air; H, charging door; I, discharging door. The process, by this furnace, nearly resembles the foregoing. The peat to be coked is placed in the body of the stove by the door H, which is then closed air-tight; this stove may be from eight to ten feet long, and three to four feet wide. It is set in

brickwork, over a fire-place with flues passing round it in the ordinary way of waggon-roofed steam boilers. The air-pipe G, and the gas escape-pipes F, F, being open, a fire is applied under the stove, and continued at a moderate heat until the desired quantity of volatile matter is expelled. And note, it is more desirable to have the process carried on by a moderate heat, and slowly, than by applying a brisk heat to drive off the gases more expeditiously, the coke, in the latter case, not being so valuable; and further, where the coke is required for the cementation of iron or steel, the manufacture of gunpowder, or other purposes where a purer carbon is required, the process must be continued until the entire of the volatile matter is driven off. When the gases are nearly expelled, the air-pipe G, is to be closed, but the escape-pipes F, F, may be kept open somewhat longer, the heat of the coke inside being sufficient to complete the process. The pipes F, F, being then closed, and the air effectually excluded from all parts, the whole is to be allowed to cool, and the coke withdrawn by the door I, as in the former case.

But I do not mean to confine myself, or my invention, to those particular kinds of stoves which I have described, but intend to avail myself of the use of other kinds of stoves, by which the same objects are effected, namely, the combining the processes of distillation and stifling, and by the admission of atmospheric air during one part of the process, and its exclusion at another, by which means the volatile parts are driven off to whatever extent it may be desirable, and without causing any loss of the carbonaceous part by a union with the oxygen of the atmosphere.

Secondly, my invention consists in the mode or process of roasting or drying the peat or moss either before or after pressure, by means of an artificial current of heated air, and by which the drying or roasting is effected more expe-

ditiously than by mere exposure to the air. For this purpose, the peat to be dried is placed in a drying room or stove, and an artificial current of heated air is made to pass through the body of the peat. The current of hot air is produced by means of a rotary fan in a cylinder, or any other of the well-known processes for producing a current of air, to be worked by the power of men, horses, or mechanical means. The air, previously to being forced through the peat, is made to pass in contact with a heated cockle, or through or between suitable plates, pipes, or flat chambers charged by fire or steam, so as to give heat to this current of air.

One mode of applying the current of heated air is as follows, see fig. 5: A, body of the chamber or stove; B, floor made of plate iron, punched full of holes, or by a brick arched floor, the bricks being so placed that there shall be, between each course, sufficient space for the hot air to pass up freely; C, the hot air chamber; D, the funnel for the escape of the hot air after it has become charged with the moisture from the peat; E, the cockle, or it may be a steam box, for heating the air; F, the fan cylinder or other blowing apparatus.

The mode of drying is as follows:—The peat is placed on the iron or brick arched floor B, in the chamber A, to any convenient depth, and according to the state of dampness in which it is; the peat is introduced by a door at one end of the chamber or stove, and may be taken out at a door at the other end; both doors being closed, and the fan F, being put in motion, a strong current of air is forced through the pipe G, the conical chamber H, surrounding the cockle E, or other heating apparatus, by which its temperature is raised to any required degree. This stream of hot air passing through the pipe I, into the long chamber C, has no means of escape except upwards, through the aper-

tures in the floor, on or over which the peat is placed, and through the peat, and in its course it carries off the moisture, and passes away by the funnel D.

This drying chamber or stove may be made from ten to fifty feet long, in proportion to the quantity of peat to be dryed. The drying effect produced being in proportion to the rapidity of the current, the quantity of air forced through it, and the degree of temperature to which it has been raised.

Secondly, my invention of a process of incorporating peat coke with resin, pitch, tar, or other bituminous matter, is effected by reducing the coke to a powder, and mixing it with such bituminous matter while in a melted fluid state, and which is easily effected by keeping it, by means of rakes, in such a state of agitation during the mixing, that a thorough union takes place. The quantity of resin or bituminous matter should be sufficient to saturate the coke powder, which will be found to be about equal quantities of each; and it may, when properly mixed, be lifted out by ladles, and placed in casks or brick-shaped or other moulds, for use. And note, where a more durable material or cinder is required, I add a small portion of powdered coal-coke, about one-fourth, to the mixture.

And, thirdly, my invention consists in a mode of rendering peat moss useful in the coking of pit coal. This improvement is effected by adding a due proportion of dry peat as taken from the bog, or after pressure, with the pit coal in the act of coking, in about the proportion of one-third peat and two-thirds coal, and which is effected in a stove already described, fig. 1, or any other stove suitable for coking pit coal. The effect of the union of peat and coal is to deprive the coal of its sulphur or other injurious substances, and by which it is rendered more suitable to the working of iron or other metals.

And whereas, the process of converting peat into coke has been practised before, by smiths and other persons, I make no claim of invention to such; but specially and exclusively claim, as my invention, first, the process of compressing dry peat (after having been saved or prepared as fuel in the ordinary way) until it has been reduced to about one-half of its original bulk, and which state of compression it will retain if thoroughly dry; secondly, I claim the exclusive use of the process or mode of converting the dry peat, so compressed, into coke, by which I am enabled to produce a tolerably condensed coke, and which is applicable to various useful purposes; thirdly, I claim the exclusive use of the process or mode of coking by means of stoves or ovens, which have a peculiar operation in the process of coking, namely, by a combination of the distillatory and stifling processes, and by which the lightest description of surface peat, without pressure, and even the broken fragments and dry dust of peat, and even without any process of drying whatever, but as taken from the bog, is converted into a coke, and which is applicable to the manufacture of an artificial coal or fuel, by its admixture with resin, pitch, tar, or other bituminous matter; and which light coke is also applicable to the manufacture of gunpowder, or to such other uses as powdered charcoal is usually applied: fourthly, I claim the exclusive use of a peculiar kind of stove, and the process of coking the highly compressed cakes of peat, as prepared by my former patent, of 1837, by which process and stove I make a solid, hard, durable, and shining coke, applicable to several purposes, and more especially to the working of metals; fifthly, I claim the exclusive use of another kind of stove, by which peat, either before or after the process of compression, is completely dried or roasted, and by which its heating power is much increased, and by which the compressed

peat cakes are sooner prepared for the coking stove than if dried by the atmospheric air alone; sixthly, I claim the process of incorporating the powdered peat coke and coal coke with resin, pitch, tar, or bituminous matter, when in a melted and fluid state, in the fabrication of an artificial coal never before made, and which is particularly valuable for steam navigation; seventhly, I claim the application of peat to the purpose of coking pit coal, by which the quality of the coal coke is considerably improved.—[*Inrolled in the Rolls Chapel Office, January,* 1839.]

Specification drawn by Messrs. Newton and Berry.

[Since the inrolment of the above, Mr. Williams has made some additions and improvements, which he has included in the specification of his Irish patent. We have, through his kindness, been favoured with a description of these improvements, which we now lay before our readers. He says, "Where a considerable number of stoves are required for coking and roasting, these stoves may be placed beside each other, as in fig. 6, in which are represented nine others, each about ten or twelve feet high and four or five feet wide. These stoves may be made square inside, so that they shall stand conveniently together. In this case it will be seen that the coking and drying, or roasting process, is carried on in alternate stoves, by which means the use of the cockle and artificial blast is rendered unnecessary, as the heat from the coking stoves will be sufficient for the roasting process in the intermediate stoves; and by the addition of a funnel, more or less elevated, as may be found requisite, and placed on the top of such alternate roasting stoves, a sufficient degree of heat and current of air will be obtained.

"These alternate coking and roasting stoves also may be conveniently arranged in the shape of an octagon, as in

fig. 7, which represents the plan of such a series of stoves, the centre spaces acting also the part of a roasting stove."—See page 333, vol. xiii., for the specification of Mr. Williams's patent of November, 1837.—Ed.]

To Sally Thompson, *of North-place, Gray's-inn-road, in the county of Middlesex, for her invention of certain additions to locks or fastenings for doors of buildings, and of cabinets, and for drawers, chests, and other receptacles, for the purpose of affording greater security against intrusion by means of keys improperly obtained.*—[Sealed 13th November, 1838.]

This invention is applicable to the setting-in motion of an alarum before any key can be introduced into the lock or fastening, or before the bolt can be withdrawn; and I accomplish this object, firstly, by placing before the keyhole of the lock or fastening, a plate forming a shutter to the keyhole, to be removed by being slidden away, or by being turned on an axis before the key can be introduced into the lock, which shutter shall be in communication with an alarm produced by the vibration of a bell or other sonorous body, situated either within the lock or contiguous to it, or in a room or place to which the motion may be conveyed.

And, secondly, by forming a communication from the bolt of a lock to a sounding body, so that the motion of the bolt in being withdrawn, shall cause a sound, or a succession of sounds, to be given at such place, within practical distance, as the proprietor of the lock shall determine.

These, the principles of *my* invention, admit of being carried into effect, according to the local and other circumstances, in a great variety of forms and modifications,

of which those shown in the drawings, hereinafter described, are given as samples, and afford sufficient information to any competent locksmith to enable him to carry the invention into effect, as variously formed as he pleases, and in as beneficial a manner as *I myself* can.

Plate XIII., fig. 1, represents a view of the inner side of a lock, with the addition of a sliding shutter to cover the keyhole at pleasure, as seen when complete, and ready to be screwed on to a door; fig. 2, the inner side of a similar lock, but with a revolving shutter; fig. 3, the appearance of the works in the interior of the lock, when the shutter, and the plate upon which the shutter slides or revolves, are removed; fig. 4, a view of the back end of the lock; figs. 1, and 3, with the spindle and return plate, as seen beyond the end; fig. 5, horizontal section from A, to B, of figs. 1, and 3, with the bolt removed to allow the works below the section to be more distinctly represented; fig. 6, the key of the lock, with a prolongation for turning the spindle, carrying the pinions which move the shutter and communicate motion to the sounding body. The same letters of reference signify the same parts in all these figures: *a*, the frame or case to which the works are affixed; *b*, the return plate at the front end of the lock, which is let in and screwed to the front edge of the door; *c*, the ordinary bolt of the lock; *d*, a screw fixed in the frame of the lock, upon which a slit in the bolt slides; *e*, the ordinary sliding spring latch; *f*, the spring and lever to throw out the latch; *g*, the ordinary system of wards; *h*, the double lever for sliding back the latch, having the usual square hole to receive the stem of the handles; *k*, the inner plate, commonly called the back plate, enclosing the works of the lock; *l*, the sliding shutter, having a toothed rack formed along the under edge, extending nearly from end to end; *m*, a dove-tailed piece sliding in a groove sunk in the plate

k, to which dove-tailed piece the sliding shutter is secured by two screws; *n*, the two screws, holding the sliding shutter to the dove-tailed piece; *p*, the revolving shutter, having teeth nearly all around its periphery; *q*, a stud fixed in the plate *k*, upon which the revolving shutter turns; *r*, a toothed pinion, by which the sliding shutter is moved longitudinally, or the revolving shutter turned on its axis; *s*, a spindle turning in the outer plate of the case *a*, and inner or back plate *k*, having an aperture of a square figure in each end, into which the prolongation of the key is made to fit. This aperture may be of a triangular or other shape, at pleasure; *t*, the ordinary key, having a prolongation of the stem, to fit the aperture of the spindle *s*, and by it to turn the pinions which move the shutters and apparatus for communicating motion to the alarum; *t′* the prolongation; *u*, a pinion fixed on the spindle *s*, inside the plate *k*, for moving a bent lever or crank *v*; *v*, the bent lever or crank; *w*, the fulcrum of the crank; *x*, the short arm of the lever for receiving motion from the pinion *u*; *y*, the long arm of the lever for communicating motion to the alarum; *z*, a link, hinged to the long arm *y*, to lead towards the alarum; *z′*, a box containing a spiral spring, represented by dotted lines in fig. 3, which spring returns the crank to its stationary situation, as shown in the drawings, after the pinion *u*, has moved the crank to the left, this spring is of the same construction as those used for the closing of candle snuffers; *z″*, a spring for returning the crank to its stationary situation, after the pinion *u*, has moved it to the right; fig. 7, represents a door lock, in which the communication with the alarum is made from the main bolt, instead of from a pinion, in which case the shutter is dispensed with; *a*, the main bolt, having four throws, and four ratchet teeth to move the lever, and ring the bell at every turn of the key. In this case it will be

advisable to make the key with a short bit, in order that there may be the more power to ring the bell; *b*, the lever, which is here represented straight, except as to two shoulders, against which the springs act; *c*, the fulcrum of the lever; *d*, the short arm moved by the ratchet teeth of the bolt; *e*, the long arm, giving longitudinal motion to the link *f*; *f*, the link to lead the motion towards the alarum; *g*, two springs counteracting each other, to hold the lever stationary when not turned aside by the ratchet teeth; *h*, two studs for abutments to the springs.

It is obvious that the lever may be made either straight or bent at such an angle as the direction of the alarum shall require.

And I hereby further declare, that I contemplate the application of *my* invention to the forming of a communication, in the manner hereinbefore shown, from all the locks in the business rooms of a banker, merchant, or other party, with one alarum, or with several separate bells placed in the bed-room of the confidential resident; the modes of forming such communications are too familiar with locksmiths and bell-hangers to need any description.

It will be quite unnecessary to show the application of *my* invention to a door-latch, a drawer-lock, a chest-lock, or cupboard-lock, a cabinet-lock, or any other lock, as the variations will only have to be made in respect to form, size, and localities, the principles remaining the same as before described.

And I hereby further declare, that I do not claim as *my* invention those common parts of a lock shown at *a*, *b*, *c*, *d*, *e*, *f*, *g*, *h*, and *k*, figs. 1, 2, 3, 4, and 5, such parts being placed in the drawings merely to elucidate *my* invention, and to distinguish the relative situations of the new and the old parts.

But I do claim the application before the keyhole of a

lock or fastening, of a covering plate or shutter in communication with an alarum, so arranged that the shutter cannot be removed from before the keyhole without the alarum being at the same time sounded, either in the lock or contiguous to it, or at any practicable distance, at the pleasure of the proprietor.

And I do claim the means of communicating motion from the bolt of a lock or fastening to an alarum placed in any convenient situation, as hereinbefore particularly shown and described.—[*Inrolled in the Inrolment Office, May,* 1839.]

To THOMAS RIDGWAY BRIDSON, *of Great Bolton, in the county of Lancaster, bleacher, and* WILLIAM LATHAM, *of Little Bolton, in the same county, machine-maker, for their invention of certain improvements in machinery or apparatus for stretching, drying, and finishing woven fabrics.*—[Sealed 26th May, 1838.]

THESE improvements in machinery or apparatus for stretching, drying, and finishing woven fabrics, consist in a novel arrangement of mechanism, designed for the purpose of effecting these objects in a superior and more complete manner, by mechanical means, than has heretofore been accomplished, and with peculiar advantage, owing to the extreme elasticity of finish which is by such means imparted to the goods.

In order that these improvements may be perfectly understood, and more definitely explained, there is attached to this description a drawing of the apparatus, constructed necessary for the purpose of stretching, drying, and finishing fine piece-goods, such as plain, or checked, or figured muslins, lace, lenoes, and other similar light fabrics; simi-

lar letters of reference being marked upon corresponding parts of the mechanism in all the figures.

Fig. 1, Plate XIV., is a horizontal or top view of the machine, in which a piece of muslin is represented distended upon tension pins, in which situation the goods may be supposed to be under the improved operation; fig. 2, is a longitudinal or side elevation; and fig. 3, is an end view of the same. Two longitudinal rails or framings *a*, *a*, extend the whole length of the piece of goods, and carry at their extreme ends, by means of brackets, the pulleys *b*, *b*, upon the peripheries of which are placed small pins *c*, *c*, at equal distances from each other; and these pins *c*, take into corresponding holes pierced in endless straps or bands *d*, *d*; upon the outer surface of these straps, near their inner edges, are fixed very fine needle or tenter points *e*, *e*, for the purpose of holding the selvages of the fabric distended as it passes through the apparatus.

The longitudinal bars or frames *a*, *a*, are attached to several transverse framings *f*, *f*, *f*, which carry the rack bars *g*, and chains *h*, *h*; these racks are well understood to be for the ordinary purpose of distending or stretching the cloth breadthwise in its wet state, immediately after it has been introduced. The framings *f*, *f*, upon which the whole of the improved apparatus is carried, are supported upon central bearings *i*, *i*, and allowed to turn or swivel upon the central pins *j*, *j*. These framings are to be placed at any convenient distance apart throughout the entire length of the machine, which is supposed to be of the same length as the piece of goods, although each end of the same is only shown in the drawing for the sake of convenience.

Now, supposing boys to be holding the end of a piece of muslin or other fabric at each selvage or side, and standing at that end of the machine shown at the right hand of the figures 1, and 2, they first place the extreme ends of the

piece upon the rails or stretchers *o, o,* in order to keep the end of the cloth square and firm, and after guiding each selvage on to the fine points or needles *e, e,* of the endless straps, the pressing rollers *e*, e*,* which are covered with felt or flannel, cause the needles *e, e,* to enter the selvages, and to hold the length of muslin or other goods securely. The attendant then throws the toothed pinions *k, k,* upon the driving shaft *l, l,* into gear with the spur wheels *m, m,* which wheels are fixed upon the same studs or shafts that carry the pulleys *b, b,* and as the pinions *k, k,* slide upon feathers or keys formed upon the driving shaft *l,* they are thrown in and out of gear by any suitable clutch box attached to the driving wheels, which give motion from the main shafting. These pulleys *b, b,* as they revolve, cause the straps to travel and carry the muslin or other goods entirely over the machine, and extend it from end to end, as represented in fig. 1.

The pinions *k, k,* are then to be thrown out of gear with the spur wheels *m, m,* and, consequently, this operation of the mechanism ceases; the muslin or other material being now stationary in the wet state, just as it had come from the squeezers or other wet process, and held in a slight state of tension in the machine, the winch handle *n,* is to be turned. This winch is keyed fast upon the stud that carries the pinion *p,* in gear with the wheel *q,* fixed upon the end of the central shaft *r, r,* and by means of small rack pinions, drives the racks *g,* and through the agency of the chains *h, h,* causes the rails *a, a,* and with them the straps carrying the selvages of the muslin, to be drawn further apart, and, consequently, to stretch or distend the muslin to the desired width. The frames are held in this state by means of the ratchet wheel and pall *s, s,* upon the winch *n,* while the cloth is undergoing the operation of drying and finishing.

We may now observe that any suitable number of these machines may be ranged side by side, or one above the other, and heated by hot air flues or in any other convenient manner.

We now proceed to describe the further process of finishing the goods, for the purpose of taking out the rigid stiffness of the piece, and causing it to feel soft and pliant, which is accomplished by bringing other parts of the mechanism into operation, while those just described are set at rest, which is effected by a vibratory apparatus, causing the goods to be stretched diagonally by repeated operations of the vibratory apparatus during the process of drying.

It will be perceived that the lever *t, t,* has two notches *u, v,* formed in it, and when the operator lifts the notch *u,* from off the piece *w,* and places the notch *v,* on to the pin or stud *x,* at the top of the vibrating lever *y,* this part of the mechanism is put into action; an upright shaft *z,* connected with the main driving power, carries the excentric 1, which, by revolving, vibrates the lever 2, keyed upon the same shaft 3, as the lever *y*: this connexion causes the lever *y,* to slide the lever *t, t,* backwards and forwards through the same length of traverse as the diameter of the excentric. Now, as this lever *t, t,* is attached to the framings *f, f,* (or it may be to the rails *a, a,* if more convenient) it will cause these reciprocating frames to vibrate upon their centres *i, i,* as shown by dotted lines in fig. 1, and to slide the rails longitudinally, which will draw the weft threads of the cloth alternately into oblique positions, as shown in the drawing, thus causing the threads of the fabric to be strained into alternate diagonal positions at every revolution of the driving shaft *z,* the effect of which will be, that by thus alternately shifting the oblique directions of the threads, the stiffening or starch which filled the interstices will become broken between the meshes of the

fabric, and thereby the desired elasticity will be imparted to the cloth, every thread being thrown up full round and independent of the adjoining threads, which will be found to give a remarkable degree of brightness to the cloth, and much improve the softness of its quality.

This diagonal stretching process being repeated until the cloth has become entirely dry, the attendant raises the lever *t*, and releases the notch *u*, from off the pin *x*, on the vibrating lever *y*, and places the notch *v*, upon the catch piece *w*, which will throw this vibrating apparatus out of gear, and at the same time, by putting the pinions *k*, *k*, into gear again with the wheels *m*, *m*, and driving them the reverse way, will cause the strap pulleys and straps to deliver the finished cloth into the hands of the attendants at the right hand end of the machine, in the same manner that it was taken from them in commencing the operation.

We would further remark, that we are perfectly aware that many simple contrivances might be devised for effecting the object of our improvements, namely, giving vibrating motion to the selvages of the cloth, for the purposes above stated; but as it is not practicable to describe every possible method in detail, we desire it to be understood that any mode, even of moving one side or selvage of the cloth, whilst the other remains stationary, we shall consider to be an evasive imitation of our invention, if for the purpose of drawing the threads into diagonal positions by mechanical means instead of manual labour; for instance, the goods may be stretched upon ordinary "clamp tables" (well known in the trade), and one side made to vibrate or reciprocate backwards and forwards while the cloth is drying thereon; or the straps and pins, as described in the apparatus, and shown in the drawings, instead of travelling together, may very easily be made to travel independently of each other, and to progress by

alternate advancing movements; or the whole apparatus may be constructed of a cylindrical form instead of horizontally, as represented in the drawing, and have either a continuous or interrupted rotary motion, and still be so contrived as to give a reciprocating action to the selvages of the cloth distended thereon; but any of these, or similar modifications of the apparatus above particularly set out, would be merely mechanical variations of the proposed improvements in stretching, drying, and finishing woven fabrics.—[*Inrolled in the Rolls Chapel Office, November,* 1838.]

Specification drawn by Messrs. Newton and Berry.

To THOMAS BIRCH, *of Manchester, in the county of Lancaster, machine-maker, for his invention of certain improvements in carding engines, to be used for carding cotton and other fibrous substances.*—[Sealed 18th November, 1837.]

THESE improvements in carding engines, to be used for carding cotton and other fibrous substances, consist, in the first place, in the application of a novel mechanism or apparatus to certain rollers of the ordinary carding engine, for the purpose of clearing or stripping them, and preventing the further progress of seeds, motes, or dirt into the engine. This improved apparatus is also made self-stripping, and entirely dispenses with the use of "flats or top cards," and also the hands usually employed to clean or strip them; and secondly, in the application of a rotary "comb" or stripper to the doffing cylinder of an ordinary carding engine.

By the application of these improvements to the carding

engine, I am enabled to run the machinery at a greater speed, and at a decrease of the vibration, which allows of more than double the quantity of material to be carded in a given time than can be effected by the means in present use.

In order that my improvements may be properly understood, I have attached to the patent a drawing of an ordinary carding engine, with my improved mechanism attached, and marked with similar letters of reference upon corresponding parts of the mechanism.

Fig. 1, Plate XIV., being a side elevation, and fig. 2, a longitudinal section, taken through the middle of the engine: *a, a,* is the cylinder or drum, covered with cards in the usual manner; *b,* the doffing cylinder; *c,* the "licker in;" and *d,* the lap of cotton or other material to be operated upon: *d**, and *e,* are the ordinary rollers and clearers for breaking up and carding as usual; *f,* is a roller clothed with cards, which I should recommend to be of fillets of fancy or open wires, and is for the purpose of clearing or stripping the licker-in roller *c,* and arresting the progress of lumps and seeds at the first entrance of the material to the engine; and *g,* is a similar roller, for clearing the drum *a,* from any smaller motes or seeds which may have escaped the operation of the roller *f.*

It will be obvious that a greater number of such rollers may be used in succession for the same purpose, but I have found that two, as represented at *f,* and *g,* have the desired effect: my improved or self-stripping apparatus is applied to these rollers for the purpose of clearing them, and superseding the necessity of top cards or hands to perform such operation: *h* 1, *h* 2, are two ordinary doffing combs or bars, *h* 1, being mounted in the upright rod *i,* which receives an up and down motion from the cranked

shaft *k*, in the same manner that ordinary doffer combs are actuated, the doffing comb *h* 2, receives a horizontal motion by means of the bell-cranked lever *l*, being attached to the upright rod *i*, and having its fulcrum at *m*; thus it will be seen, that as the cylinder *a*, revolves in the direction of the arrows, the doffers *h* 1, and *h* 2, will strip or clean the rollers *f*, and *g*, and prevent the coarser parts of the cotton or other material from passing further on to the carding cylinder *a*.

Now, in order to prevent the return of the doffer *h* 2, injuring the face of the cards after they have been cleared, I have attached the comb to a link at the top of the bent lever *l*, which has a stud and inclined plane upon it, for the purpose of allowing it to rise and fall slightly to and from the face of the roller as it reciprocates; but any small contrivance may be attached to effect this object, as the points of the cards would sustain some injury if the doffer comb remained in contact with them.

The application of my improved rotary doffer comb is shown at *n*, and is to be used for stripping the doffer cylinder, instead of the comb bar in ordinary use. This rotary doffer will be found to prevent the great shaking and vibration of carding engines, generally caused by the crank motion for working the doffer comb therein used.

Having now described my improvements in carding engines, I wish it to be distinctly understood that I claim, as my invention, the application of self-stripping rollers to carding engines, in the manner, and for the purposes above described, whether they are stripped by a vertical, horizontal, rotary, or any other doffer bar; and also the novel application of a rotary doffer or doffers to the ordinary doffing cylinder of carding engines, without in any way confining myself to the construction of the same, as it may have one, two, or more blades, or be a square, triangu-

lar, or fluted bar; but I claim the use of the rotary doffer as before described, however it may be varied in its construction.—[*Inrolled in the Rolls Chapel Office, May,* 1838.]

Specification drawn by Messrs. Newton and Berry.

To William Davis, *of Leeds, in the county of York, engineer, for his invention for an improvement in the machinery for dressing woollen or other cloths requiring such process.*—[Sealed 25th February, 1835.]

The nature of my said invention, and the manner in which the same is to be performed, is described and ascertained as follows, that is to say, this improvement in machinery for dressing woollen or other cloths requiring such process, consists in the application of a metallic bed, adjustable in its length to the different breadths of cloths to raise the pile or nap upon; and a wire guard or grating, to prevent the too powerful action of wire cards upon the cloth under operation. It is represented with appendages in the drawing, upon a scale of one inch and a half to a foot, and calculated for broad cloth; but for other cloths, such as narrows or extra breadths, the parts may be made in proportion. The cloths may be drawn over the bed by the usual means, as in brushing machines or gig-mills, wire cards, upon a metal cylinder, with rotary motion acting upon it through the wire guard or grating at the same time.

I do not think it necessary to show the framework, as that forms no part of this invention, and being so easy of adoption by any person that is competent of making the parts herein specified, and which is given in position for working at figs. 3, and 4, the same letters in all the figures indicate the same parts.

Fig. 1, Plate XIV.; *b*, is the wire, it is woven on each

side of the opening, for the purpose of nailing to wooden pegs in the iron casting *c*, or otherwise fixing; or, instead of being woven, it may be made in the same manner that stays or reeds for weaving are made, from six to ten wires of No. 12 to 20 may be the pitch per inch: it will be seen that it is fixed a little oblique. The casting rests by its pivots *d*, and adjusting screws *x*, which the frame of the machine may be made to support.

Fig. 2, is the iron bed, shown horizontal; the part *d*, is the shell, and *e*, are sliding pieces, moveable in the shell by means of the handles *f*, and pinions *g*, taking into the racks formed in the ends of the sliding pieces *e*; the upper projecting edges of the sliding pieces *e*, are formed into wedge-shape, which may be seen by the section 9. Fig. 3, is a front view of the bed and guard in the position for working; fig. 4, is an end view of the same, showing also how the cloth may be drawn, as in brushing machines. The projecting ends *k*, of the shell, slide in vertical grooves in the framing, and is supported by the excentric pieces *i*, on the bar *k*, and is lowered when necessary, by lifting the handle *l*. The bed is adjustable to the cylinder or cards by means of the supporting screws *m*: *n*, fig. 4, shows the position of the iron cylinder covered with cards, for raising the pile or nap; and *o*, another cylinder, grooved on the surface, for the purpose of smoothing the face of the cloth. It is indispensable that the beds and cylinder be made very accurate.

It will be found that the present improvement in machinery for raising the pile is the first and only instance of the application of a wire grating guard for protecting the cloth when under the operation of raising; also of the metal bed, adjustable to the breadth of cloth to raise the nap upon, by the action of wire cards, &c. upon a cylinder.

By means of this bed, the cloth can be raised without

raising the list of the piece, the width of the bed determining the width of cloth to be raised by the cards, &c.—[*Inrolled in the Rolls Chapel Office, August,* 1835.]

Specification drawn by the Patentee.

To WILLIAM DOBBS, *of the Penn-road, Wolverhampton, in the county of Stafford, brass-founder, for his invention of certain improvements in racks and pulleys for window blinds and other useful purposes.*—[Sealed 30th June, 1838.]

THESE improvements in the construction of what are called rack pulleys, for giving tension to the cords of roller window blinds, consist in a novel mode of manufacturing the boxes, cases, or frames, in or upon which the tension pulley slides; and also in a method of confining the pulley in the box, case, or frame, by means of a screw, when the cord has been drawn to its required tension.

In preparing the racks for the pulleys, that is, the boxes, cases, or frames, in or upon which the pulley is to slide, instead of casting from molten metal these boxes, cases, or frames, in the required form; or of bending up the edges of plates by hammering, in the manner which has been heretofore commonly practised, I produce the boxes, cases, or frames from flat thin sheet metal, by the operation of drawing, in a manner nearly resembling that in which metal tubes are finished at a draw-bench.

I first cut out from a thin plate or sheet, by means of shears or otherwise, suitable strips of flat metal, and after slightly bending up the end of each strip, pass it, as at A, fig. 1, Plate XV., through a hollow frustrum of a cone, shown at B. As the strip proceeds through the hollow cone,

its edges are gradually bent inwards; and after passing the smaller end of the cone, and through a suitable hole in the steel plate C, shown detached in front view at fig. 2, the strip comes out in a partial tubular shape, as at D.

When this has been done, the tube must be annealed and scoured, and then slipped on to a steel rod or mandril E, of the form in which the box, case, or frame is desired to be made; which rod and tube, together, are to be passed into a properly-shaped hole in another steel plate, a front view of which is shown at F, fig. 3.

This plate is then placed on a draw-bench, and the end of the rod and tube E, taken hold of by a pair of suitable pliers G, shown at fig. 4: on a sufficient force being applied by a draw-chain to the handles of the pliers, the rod and tube is drawn through the plate, and delivered on the opposite side, as at H, in the finished shape required.

The open tube, thus prepared, is then to be slipped off the rod or mandril, and cut up into suitable lengths for constituting several rack frames, boxes, or cases, for the sliders of the tension pulleys to act in or upon, and their ends may be trimmed, shaped, and stamped as usual, and made to appear as at fig. 5.

If spring pulleys, as shown in the section at *a*, fig. 6, should be required to act in these boxes, they may each have a series of ratchet teeth *b*, formed up the middle of the back plate, by means of a rolling indented die, or by any other ordinary or convenient apparatus; but I prefer leaving the back plain, and adapting, instead of the spring-catch, my improved screw fastening in the means about to be explained.

Fig. 7, represents sectional views of fig. 5: *c*, *c*, in each of these figures, shows the front edges or flanges of the box, case, or frame; *d*, is the tension pulley, fitted loosely upon

a stud *e, e,* which stud is screwed into a block, clamp, or sliding plate *f,* behind the flanges of the box. When the pulley has been drawn down sufficiently far to put the cord *g,* of the roller blind in proper tension, the knob or rose head of the stud *e,* is to be turned so as to draw up, by means of its screw, the block, clamp, or plate *f,* tight against the back part of the flanges, which will cause the clamp and stud of the pulley to remain firmly fixed in their position in the frame, and thereby retain the pulley or tension; but it may be readily released, and the tension of the cord relaxed by turning the screw stud *e,* in the opposite direction.

Having now described my invention, and the manner of carrying the same into effect, I desire it to be understood that I do not intend to confine myself to any particular forms of boxes, cases, or frames, for supporting the tension pulleys for roller blinds; but I claim the making of such boxes, cases, or frames, by means of drawing strips of thin metal through a cone and through a draw-plate, in the manner in which metallic tubes are usually finished; and also the adaptation of tubes so made, as boxes, cases, or frames, for the slides of bell-pulls and other useful purposes. And I further claim the contrivance for fixing the stud of the pulley by means of a clamp and screw, as above described.—[*Inrolled in the Rolls Chapel Office, December,* 1838.]

Specification drawn by Messrs. Newton and Berry.

To JONATHAN DICKSON *and* JAMES IKIN, *both of Holland-street, Blackfriars-road, in the county of Surrey, engineers, for their invention of improvements in the process of making gas from coal or other substances,* —[Sealed 6th February, 1838.]

THIS invention is divided into three parts, consisting, firstly, of a new mode of distilling the coal; secondly, an improved method of purifying the gas; and thirdly, a new mode of conducting the gas from the purifyer to the gasometer.

The first part of the invention consists in placing the retorts in contact with the combustibles or heated fuel, so that they are surrounded on all sides by fuel in a state of combustion. The difference between this method and the old one is, that whereas the retorts, according to the old method, are subjected to a very great degree of heat by the flames impinging upon them, and thus destroying or considerably injuring them in a very short space of time; they are, in the present instance, only subjected to a comparatively low heat, and they are placed in contact, and are surrounded by the fuel in an ignited state.

Fig. 1, Plate XV., represents a section of this apparatus: *a, a, a,* is the brickwork; *b, b, b,* the retorts; *c, c,* the ash-pits; *d, d,* are pipes through which air is allowed to pass to the fuel; *e, e,* are pipes for ascertaining the state or heat of the fuel, and they may have holes made in them to supply air to the interior. A steam boiler, for purposes hereafter mentioned, may be placed on the top of the apparatus, as shown by dotted lines.

Fig. 2, represents a section of the purifyer and cooler: it consists of a chamber strongly constructed of iron, and is divided into two parts by a partition placed in the middle, and attached to the ends of the apparatus. This par-

tition, as well as the sides of the purifyer, is furnished with shelves *a, a, a, a, a, a,* which are perforated with holes; *b,* is a cistern placed above, and contains plain water; *c,* is another cistern, containing lime water. These cisterns communicate with the purifying chambers by means of cocks *d,* and *e.* It will now be understood that when the cock *d,* is opened, water will flow from the cistern *b,* on to the shelf *a,* attached to the side of the apparatus; and as the shelf is perforated with holes, part of the water will run through in a shower, and part run over the edge in a sheet, and fall on to the other shelf *a,* which is attached to the partition, from whence it will descend in like manner on to the shelf below. By this means the water will be minutely subdivided, making a continued shower and sheet, falling from one shelf to the other until it arrives at a reservoir below, from which it is pumped up again into the cistern *b.* The lime water in the cistern *c,* flows through the cock *e,* and falls from shelf to shelf in the same manner. The gas to be purified is admitted by the pipe *f,* and ascends through the apparatus in the tortuous direction represented by the dotted line, and passing over the top of the partition, descends on the other side in the direction of the arrow, and makes its exit through the pipe *g.*

Fig. 3, represents the third part of the invention, namely, the method of conveying the gas from the purifyer to the gasometer: *a,* and *b,* are two chambers of the same dimensions, made of iron, and communicating with each other by the pipe *c*; the lower chamber *a,* is nearly filled with water, and the chamber *b,* is filled with gas by the pipe *d,* through the valve *e,* opening inwards: steam which is generated in the boiler placed over the retorts is then ad mitted through the pipe *f,* which, as it exerts its expansive force on the surface of the water, presses it up into the chamber *b,* and thereby expels the gas through the valve

g; the water will then return to its original position in the chamber *a*, as the steam loses its power and becomes condensed.—[*Inrolled in the Inrolment Office, August*, 1833.]

To THOMAS HILLS, *the younger, of St. Michael's-alley, Cornhill, in the city of London, gentleman, for his invention of certain improvements in furnaces for steam boilers and other useful purposes.*—[Sealed 21st February, 1833.]

THIS invention consists in keeping the apron or dead plate of furnaces at an uniform red heat, by applying heat to the under surface of it, so that when coals are thrown thereon, they may be deprived of their gaseous parts, and be reduced to coke previous to their being pushed forward on the fire bars of the furnace.

Fig. 4, Plate XV., is a section of a furnace, constructed on this principle: *a*, is the apron plate or dead plate, which is heated by a fire from beneath at *b*: the fire bars of the ordinary furnace are seen at *c*, and the end of the flue at *d*.

This is the whole of the invention; and the Patentee claims heating the apron plate of furnaces, so as to deprive coals, thrown thereon, of their gaseous particles.—[*Inrolled in the Inrolment Office, August*, 1833.]

To BARON HENRY DE BODE, *Major-General in the Russian Service, of the Edgeware-road, in the county of Middlesex, for his invention of improvements in apparatus for retarding and stopping chain or other cables or ropes on board ships or vessels.*—[Sealed 23d May, 1837.]

THIS invention is described as consisting of a peculiar arrangement of apparatus for producing a lever action, which, when in use, prevents chain or other cables from emerging

out too freely, by pressing upon them; by that means creating a great deal of friction, and thereby governing the movement of the cable, and regulating or stopping it altogether if necessary.

Fig. 5, Plate XV., represents a partial section of the apparatus: *a, a,* is the framework made of cast iron, or wood strongly secured by iron bolts; *b, b,* are rollers, over which the cable *c, c,* passes; *d,* is a lever having a roller *e,* mounted at its lower end, to prevent it from injuring the cable; *f,* is a handspike or handle for depressing the lever *d,* and causing the roller *e,* to bear or press on the cable, thereby creating friction. By this means, any degree of holding may be obtained, which will retard or wholly stop the movement of the cable.

The Patentee lays no claim to any of the parts separately; and he does not confine himself to the precise form and arrangement, provided the principle of the invention is retained; but he claims, as his invention, the combining an apparatus, similar to that above described, for retarding and stopping chain or other cables and ropes.—[*Inrolled in the Inrolment Office, November,* 1837.]

To Joshua Horton, *of Taylor's Dock, Birmingham, boiler manufacturer, for his invention and improvement in the manufacture of wrought iron chains, applicable to various purposes.*—[Sealed 23d March, 1833.]

This invention is for a new method of constructing flat pit chains, so as to render them lighter and stronger than those in common use. The links of the chains are made of wrought iron of a cylindrical form, and having flat eyes made at each end, through which an iron pin is passed and rivetted.

Any desired number of links may be placed side by side, to make a strong chain, as seen in fig. 6, Plate XV., which represents a portion of a chain constructed according to this invention; and fig. 7, represents a single link detached, and shows the shape of the eyes at the end thereof. —[*Inrolled in the Inrolment Office, September,* 1833.]

To JOHN POTTER, *of Ancoats, near Manchester, in the county of Lancaster, cotton-spinner, for his invention of an improvement or improvements in the process of preparing certain descriptions of warps for the loom.*— [Sealed 9th November, 1837.]

THIS invention is divided into two parts, and consists, firstly, in an addition to, or alteration in, the old machine for dressing warps that have undergone the sizing operation; and secondly, in a machine, by means of which a warp of great length may be obtained, without the necessity of piecing or joining, as is the case with ordinary warps. The Patentee says, in the first place, that considerable trouble and difficulty arises in dressing sized warps, from the fact of the threads sticking together, and thereby preventing the warp from progressing through the machine with that regularity which is desirable. The first part of the invention is intended to correct this evil; and the mode of effecting this will be understood by reference to fig. 8, Plate XV.: *a, a,* is the sized warp passing over and under a framework consisting of two rods *b, b,* having an alternating motion given to them by means of a vibrating lever *c,* to which they are connected at *d,* this point being also the centre upon which they vibrate; the lower end of the vibrating lever *c,* is attached to a connecting rod *e*; and the other end of this rod *e,* is connected to

an excentric *f*, that is made to revolve by any suitable gear work.

The second part of the invention is so unintelligibly described, that we are utterly at a loss to understand the Patentee's meaning. It seems that the warp is divided into ten small beams, which are filled one after the other in the warping machine; but for what purpose this is done the Patentee does not say.—[*Inrolled in the Inrolment Office, March,* 1839.]

To John M'Curdy, *of Southampton-row, in the county of Middlesex, Esq., for his invention of certain improvements in machinery for acquiring power in rivers and currents, partly communicated by a foreigner.*—[Sealed 22d January, 1833.]

This invention is intended to supersede the use of water wheels, and consists of two crank shafts mounted in bearings one above the other, and of any desired distance apart, so that the cranks of the one shaft clear the other. The cranks on both shafts have exactly the same throw, and are connected together by rods which are continued below the lower shaft, and have paddles of the south sea form attached to their ends. Two or more cranks are made on each shaft; and they are placed at such angles to each other, that the paddles may enter the water in regular succession.

Plate XV., fig. 9, is a representation of the apparatus; the crank shafts *a*, *b*, being connected together by rods *c*, *c*, *c*, having paddles *d*, *d*, *d*, at their lower ends. The crank shafts turn in suitable bearings, and the lower one has a cog wheel *e*, mounted on it for the purpose of communicating motion to the machinery within, if it is intended to

be used as a water wheel, or for receiving motion from any first mover placed in the vessel, if it is intended to act as a paddle wheel. By this arrangement of mechanism, it will be seen that the paddles both enter and leave the water in a perpendicular position; there is, therefore, no back water. The cranks may, if preferred, be made singly and bolted together.—[*Inrolled in the Inrolment Office, July,* 1833.]

To JOHN HALL, *of the town of Nottingham, in the county of Nottingham, lace-manufacturer, for his invention of certain improvements in machinery, whereby cloth or woven fabrics of various kinds may be extended or stretched, and dried in an extended state.*—[Sealed 5th December, 1837.]

ALTHOUGH this invention is described at considerable length in the specification, yet the principal features of it may be explained in a very few words. After the fabric to be stretched has been passed between a series of rollers and through a sizing box, it is taken up to be stretched or extended by two wheels set at an angle to each other; the peripheries of these wheels being furnished with pins, points, or hooks, to hold the fabric.

Plate XV., fig. 10, represents a plan view of this part of the apparatus: *a, a,* are the stretching wheels referred to, which are not placed parallel, but at a slight angle to each other, and gradually extend or stretch the fabric as they revolve in the direction of the arrow; *b,* is a roller which receives the fabric from the wheels after it is stretched; the ends of this roller are furnished with pins to prevent the fabric from collapsing. The fabric is then passed between a series of rollers to be dried, some of them being hollow

and heated by steam. The Patentee does not claim any other part of the apparatus but the wheels *a, a,* for stretching the cloth.—[*Inrolled in the Rolls Chapel Office, June,* 1833.]

To Edward Lucas, *of Edward-street, Birmingham, in the county of Warwick, engineer, for his invention of a self-acting force and lift pump.*—[Sealed 11th February, 1833.]

This invention is a certain mechanical arrangement, by means of which an ordinary force and lift pump may be made self-acting. The contrivance shown for effecting this object, is represented at fig. 11, Plate XV.: *a, a,* is a common force pump applied to a well. To the end of the piston rod of this pump a chain *b,* is attached, having one end connected at *c,* to the shorter arm of a lever *d.* At the extreme end of the lever *d,* a box *e,* is placed, and supported by the pin *f,* upon which it swings; *g,* is a cistern or tank, supported on pillars, and supplied with water by a pipe *h.* The action of this apparatus will be as follows:—Water will run from the cistern by the pipe *i,* into the box *e;* and when a sufficient quantity has run into the box, its weight will cause the lever *d,* to descend, and empty the box, as shown by dots, into a cistern *j,* below. When the box has emptied itself, the lever will be made to ascend again by means of a weight *k,* that is attached to the piston rod. The supply of water from the cistern *g,* is regulated by a weighted lever *l,* which is raised by a rod *m,* when the lever *d,* ascends; and when the box is supplied with a sufficient quantity of water to overcome the weight *k,* on the piston rod, it descends, and the supply of water is cut off by the weighted lever *l.* Two

or more of the levers *d*, and boxes *e*, may be applied to work as many pumps in the same well if it is desired.—[*Inrolled in the Inrolment Office, August*, 1833.]

To NICHOLAS TROUGHTON, *of Broad-street, in the county of Middlesex, for improvements in the process of obtaining copper from copper ores.*—[Sealed 22d December, 1835.]

ACCORDING to the ordinary process of obtaining copper from copper ores, it has several times to undergo the operation of calcining or roasting in reverberatory furnaces, by which means the vapours produced by the fuel (which heats the metal) mixes with the vapours generated by the application of heat to the copper ores, and the combined vapours, after passing through the flues, and the chimney or shaft, go off into the atmosphere; by which means, and in consequence of there being sulphur and other prejudicial matters contained in the ores, the neighbourhood becomes materially injured, particularly so far as relates to vegetable life; and in order to prevent such injurious effects in the process of obtaining copper from ores containing copper, various means have been resorted to: such, for instance, as passing the vapours from the furnace combined with vapours from the ore over water contained in the flues; and in some other instances, it has been proposed to pass the combined vapours in flues, down which minute jets or streams of water are caused to enter and mix with the said vapours: and it has been proposed by some persons, though I believe never carried into effect, in consequence of the immense quantity or volume of vapour which would have to be operated on, to cause the combined vapours aforesaid to be forced through water by pumps or such

like apparatus; but none of these propositions have, to any material extent, prevented the prejudicial and injurious effects of the sulphurous and other vapours given off from the ores containing copper, being, for the most part, permitted to pass into the atmosphere. Now the object of my invention is to prevent the vapours from the fuel of the furnace mixing and combining with those which are evolved from the ores containing copper, and causing those vapours which arise from those ores to be brought in contact, and be washed or acted on by water, by which the sulphur and other prejudicial matters are, for the most part, caused to be separated from such vapours previously to their passing into the atmosphere; and it is preventing the vapours of the fuel in the furnace combining or mixing with those evolved by the ores containing copper, that the quantity of vapours which have to be operated on are comparatively small; at the same time, they are the only vapours which contain, and are, for the most part, constituted of sulphurous and other injurious matters, for the coal, from which the requisite heat is obtained for carrying on the operation of calcination, contains little matter which is prejudicial.

At the same time I do not claim as my invention the calcining of ores containing copper, and thus separating the vapours of the fuel thereof: when the same is used uncombined, with means or apparatus for washing or causing the vapours evolved from the ores containing copper to be acted on by water, in order to condense and separate the sulphurous and other prejudicial vapours therefrom. For I wish it to be understood, that my invention relates to the operating on the vapours only which are separated from ores containing copper, when the same has not been permitted to combine with the vapours evolved from the fuel in the furnace.

Having thus explained the nature of my invention, I will proceed to describe the manner of performing the same: I construct a furnace, having a series of retorts or ovens set therein, similar to gas retorts, but made of stonebridge clay or other suitable material, from one end of which passes a tube to a common main, for a series of such retorts; and I prefer that such ovens or retorts should be capable of containing about three hundred weight. These retorts are to be filled to the depth of about four inches, at the ends opposite to where the tubes to the common main are affixed, by a tile or brick having a hole or opening about two or three inches square for the admission of atmospheric air, and the ore is from time to time to be turned over, in order to be acted on equally by the atmospheric air; but these holes may be more or less closed by fire clay during the operation of calcining the ore, according to the judgment of the workmen. And the sides or edges of these tiles or bricks at their junctions with the retorts or ovens are to be stopped with fire clay; and the chimney of the furnace has a damper, by which the workman can damp and regulate his fire in order to keep the heats of the retorts or ovens to the proper temperature, which he will readily judge of by looking at the ore through the openings formed in the tiles or bricks at one end of each retort or oven, as has been before described. To the main pipe which receives the vapours which arise from the ore contained in the retorts or ovens, there is applied an exhausting and blowing apparatus, such as are used at iron or other works for blasting the furnaces; but it should be remarked, that whatever be the construction or arrangement of such blowing and exhausting apparatus, the materials of which the same is constructed should be such as are not acted on prejudicially by the sulphurous and other vapours evolved from the copper ore, such as lead,

From such exhausting and blowing apparatus proceeds a pipe, which leads to and passes over the surface of a tank or reservoir kept constantly supplied with fresh water; and from the pipe leading from the blowing apparatus, a series of small pipes proceed nearly to the bottom of the reservoir or tank of water; and it will materially depend on the smallness of these pipes, and the consequent smallness of the streams into which the vapours are divided, which are fixed through them, that will determine the depth of the water in the tank: the more minute the streams of vapour, the less depth of water will be required, for fully effecting the washing, condensing, and separating of the sulphurous and other prejudicial vapours from those evolved from the ores containing copper, when under the operation of being calcined.

Having thus explained the nature of my invention, and the manner of carrying the same into effect, I would wish it to be understood that I lay no claim to the various apparatus herein described, they forming no part of my invention when uncombined, for the purpose of performing my improvement in the process of obtaining copper from copper ores; and I would have it understood that I do not confine myself to the precise arrangement herein described, as the same may be varied, though, from my present experience, the means described are the best I am acquainted with for carrying my invention into effect, which consist of operating on the vapours evolved from copper ores passing from ovens or retorts to which the requisite heat for calcination is obtained, without permitting the vapours of the fuel to mix with those from the ores by water, whereby the sulphurous and other injurious matters are condensed and separated, and not permitted to pass into the atmosphere, as above described.—[*Inrolled in the Inrolment Office, June,* 1836.]

To Luke Hebert, *of the Bristol-road, Birmingham, in the county of Warwick, civil-engineer, for a new or improved process or processes of embalming the dead, and for preserving corpses for anatomical purposes.*— [Sealed 6th November, 1838.]

The method of preserving dead bodies, as set forth, is by injecting by the carotid artery a solution of acetate of alumine, which will find its way all through the veins and arteries of the body. The strength of the above solution should be about 28 to 30 degrees of Beaume for ordinary subjects, but for dropsical subjects the solution may be of the strength of from 36 to 40 degrees. The acetate of alumine will preserve the body internally; but if some precaution is not taken, the surface of the body will become covered with a sort of mouldiness. To prevent this, it will become necessary to dress the corpse in a shirt and stockings, or any other garment, according to the sex of the deceased, the body is then placed on an oil skin, and upon the cloths or covering an aromatic mixture of the following ingredients is sprinkled:—the essences of cloves, citron, and cinnamon; the alcoholic tincture of muse, spirits of lavender, spirits of turpentine, camphor, and euphobium. The garments and oil skin are then bound round the deceased with a band, somewhat in the manner in which Egyptian mummies are prepared. In preserving bodies for dissection, the sulphate (quere acetate) of alumine is injected, and a chemical action takes place, in which acetic acid is disengaged, which, combining with lime that is in the body, preserves the muscular fibres.—[*Inrolled in the Inrolment Office, May*, 1839.]

To MATTHEW WARTON JOHNSON, *of Buckingham-place, in the county of Middlesex, sculptor and stone-mason, for his invention of improvements in the construction of coffins.*—[Sealed 15th August, 1838.]

THIS invention relates to a method of fastening the lids or covering of coffins made of marble or stone, and consists in making a step all round the inside edge of the sides and ends of the coffin, so that the lid or covering may be let down and made rest on the said step, the surface of the lid being, by this arrangement, lower than the sides of the coffin. Holes are then drilled through the sides and into the lid, and spring catches are pushed in when the lid is required to be closed. It should be observed, that the ends of the spring catches must be countersunk, and the holes filled up with metal or cement. The Patentee does not claim the exclusive right of making coffins of stone, but only the method of fastening the lid as above described.—[*Inrolled in the Inrolment Office, February*, 1839.]

To MOSES POOLE, *of Lincoln's-inn, in the county of Middlesex, gentleman, for improvements in printing, being a communication from a foreigner.*—[Sealed 5th December, 1837.]

EVERY person at all acquainted with letter-press printing, knows that in the operation called in the trade "making up" or "imposing," small wedges made of wood are used, for the purpose of fixing and holding the type tight. Now, the present invention merely consists in using wedges constructed of malleable iron, in place of the wooden ones heretofore used. These wedges are hollowed out in the middle, to make them lighter than they otherwise would

be; and the Patentee considers that the use of these metal wedges will effect a great saving in letter-press printing.—[*Inrolled in the Inrolment Office, June*, 1838.]

To Joseph Gibbs, *of the Kent-road, in the county of Surrey, engineer, for his invention of improvements in the means, apparatus, and machinery for exhibiting scenery, paintings, or certain descriptions of pictures.* [Sealed 4th April, 1833.]

This invention consists in suspending pictures or scenery from an endless rope or cable, which is passed round pullies and supported by wharves in such a manner that the said pictures or scenery may be gradually passed before the spectators. This endless line of scenery may be passed, by the means before mentioned, nearly the whole of the way round an exhibition room, thus giving a very extended field for exhibition.—[*Inrolled in the Inrolment Office, October*, 1833.]

To John Spurgin, *of Guildford-street, Russell-square, in the county of Middlesex, doctor of medicine, for his invention of a new or improved ladder or machinery, applicable to the working of mines and other useful purposes.*— [Sealed 7th April, 1836.]

This ladder or machinery, applicable to the working of mines and other useful purposes, has the horizontal staves or treads of the ladder affixed to, and supported by and between a pair of endless ropes or chains, which are extended over revolving drums mounted upon horizontal axles, and capable of being turned round by the power of

machinery, one of the drums being situated at the top of the shaft, and the other at the bottom.

In order to facilitate the manner of raising and lowering of persons, a small moveable step or foot-board is applied to the ladder by attaching it thereto by hooks or otherwise. A sort of cradle or moveable platform, for conveyance of waggons up and down the shaft, is also attached to the ladder in the same manner as the foot-board.

The Patentee claims as follows:—" The endless ladders hereinbefore described, with the revolving drums turned by mechanical power, over which the endless ladders circulate in the manner described; and also the foot-boards and hand-rails which are applied to such endless ladders, together with the cradles or moveable platforms, and other apparatus applied thereto, for the purpose of conveying waggons containing ore, earth, or minerals, or persons, who may be seated in such waggons, to and from the bottom of the shaft."—[*Inrolled in the Inrolment Office, October*, 1836.]

To George Robert D'Harcourt, *of King William-street, in the city of London, civil-engineer, for improvements in the manufacture of paper, being a communication from a foreigner.*—[Sealed 15th August, 1838.]

These improvements consist in manufacturing paper of substances not hitherto used for that purpose; and also in the method of reducing those substances to a fit state to be converted into paper.

The materials employed are the leaves and stalks of the aloe, the sheathes or covering leaves of the maize or Indian corn, the stalks of field beans, and also the stalks and leaves of the scarlet and French beans; the bines, leaves,

and other parts of the hop plant; the stalk of the rice plant, of the asparagus, and lastly, the stalks and leaves of the potato plant.

These materials, when they come to maturity, are classed together, and are submitted to the action of cold soft water in a tank, for the purpose of maceration, or separating the glutinous parts from the fibres. In cold weather these materials may be subjected to the process of fermentation, aided by heat. When the glutinous parts of the plants are sufficiently softened by this maceration, the materials are to be subjected to pressure, for the purpose of entirely removing such parts; after which the fibres are placed in a tank, and steeped in a mixture of lime water and oil (not fish oil), and after remaining a sufficient length of time, they are then removed to a close vessel, into which steam is admitted, the materials being kept in a continual state of agitation during the time they remain in the vessel.

The fibres, which will then have become bleached, are subjected to the process of trituration, as in the ordinary method of paper making, and are then in a fit state to be made into paper.—[*Inrolled in the Inrolment Office, February,* 1839.]

To Auguste Coulon, *of Tokenhouse-yard, in the city of London, merchant, for improvements applicable to block-printing, being partly a communication from a foreigner residing abroad.*—[Sealed 26th March, 1838.]

This invention is for an improved method of adapting the colouring brush to the sieve of a press for printing paper hanging and calicoes, and also for a new method of supplying the colour to the sieve.

The first part of the invention consists in fixing the

brush in a framing or carriage, which is mounted on rollers or wheels that run in grooves, and to the end of this framing a weighted cord is attached, so that when the workman brings the brush forward to colour the block, when that operation is finished, he has only to let the handle of the brush go, and it will quickly return to its original position.

The second part of the invention consists in making a cylinder of tin or wood, for holding the colouring matter; and at the bottom of this cylinder openings are made, through which the colour runs on to the sieve: these openings are regulated by means of screws.—[*Inrolled in the Inrolment Office, September,* 1838.]

To George Barnett, *of* 49, *Jewin-street, in the city of London, tailor, for his invention of an improved button for protecting the thread or shank from friction and wear.*—[Sealed 7th April, 1838.]

We do not exactly understand the merits of this invention; but, in order that we may not mislead our readers, we give the description nearly in the Patentee's own words:—He says, "I fasten, affix, or form a hollow neck or collar on to, upon, or out of buttons, which protects the threads and flexible shank from wear.

"In brace or other buttons without a shank, whether they are made of horn, metal, bone, ivory, tortoiseshell, pearl, paper, wood, or any other material, or mixture of the above materials, and made with any number of holes for the threads, the neck or collar has a bottom to it, through which the holes are made. In flexible shank buttons the neck or collar has no bottom, but is left open so as to allow the flexible shank to protrude or be drawn

through; and if it is convenient, or be considered desirable, an ornament may be placed over the top of the button."

The Patentee says, in conclusion, "I rest my invention on the hollow neck or collar."—[*Inrolled in the Inrolment Office, June,* 1838.]

To DAVID STEAD, *of Great Winchester-street, in the city of London, merchant, for an invention for making or paving public streets and highways, and public and private roads, courts, and bridges, with timber or wooden blocks, being a communication from a foreigner.*—[Sealed 19th May, 1838.]

THIS invention is for a method of paving roads and other places with timber. The wood employed is oak, pine, beech, or any other hard wood, cut or formed into hexagonal blocks, which must be boiled in tar for the purpose of preserving the wood and filling up the pores, thereby rendering it harder and more solid.

When the foundation of the road or way is properly prepared to the required curve or slope, the blocks are to be placed thereon in close contact, the fibres of the wood being in a vertical position.

The blocks may be secured by dowelling, or in any other convenient manner, and when they are fixed tightly in the positions they are to remain in, the interstices may be filled with pitch, or pitch and sand; but this does not form any part of the invention. The wooden blocks may also be made in a triangular form, or even square; but when made of the latter form, the blocks should be placed diagonally across the road, so as to prevent any given junction line from receiving a sudden shock.—[*Inrolled in the Inrolment Office, September,* 1838.]

To James Vincent Desgrand, *of Size-lane, in the city of London, merchant, for a certain new pulpy product or material to be used in manufacturing paper and pasteboard, prepared from certain substances not hitherto used for such purposes, being a communication from a foreigner residing abroad.*—[Sealed 15th May, 1838.]

This invention is for a method of reducing wood to a pulpy state, and employing it as an article of which paper and pasteboard may be manufactured. The wood used is of that description called white wood, such as poplar, which is reduced to chips or small pieces in any convenient manner. The wood must then be sorted and deprived of every particle of bark, and the white parts of the wood placed by themselves to make white paper, and the slightly coloured parts by themselves to make coloured paper.

The chips are then placed in an air-tight vessel, having a proper outlet, and submitted to the action of lime water; they are to remain in this vessel for some weeks, the specific time being regulated according to the temperature of the atmosphere.

After remaining in this vessel a sufficient length of time, the fibres will become separated, or so completely loosened that they may be parted by the hand; the lime water is then to be drawn off, and the fibres washed with clean water to carry off any of the lime that may remain. The fibres are then to be submitted to the action of stampers, for the purpose of more completely separating and pounding them, and reducing them to a pulpy state, when they will be ready to be mixed with any other materials, and manufactured into paper.—[*Inrolled in the Inrolment Office, November*, 1838.]

To WILLIAM PALMER, *of Sutton-street, Clerkenwell, in the county of Middlesex, manufacturer, for his invention of improvements in printing paper-hangings.*—[Sealed 29th July, 1837.]

THIS invention is a new mechanical arrangement for block-printing, by means of which the block is transferred alternately from the sieve or colouring table to the paper intended to receive the impression.

The block is fixed in an iron framing, which turns in bearings made in the framework of the machine, so that it may be turned over on to the table to receive the colour, which is applied to the sieve by a boy, and then turned back again on to the paper to give the impression, pressure being given by suitable mechanism.

The Patentee does not claim any of the parts separately, but claims, as his invention, firstly, the mode of combining a flat colour surface with the combined apparatus for moving and working the block or printing surface in the process of printing paper hangings, whereby the block or printing surface is brought alternately to the flat colour table and to the paper to be printed; and secondly, the mechanical arrangement described in the specification for obtaining the requisite pressure to the block or printing surface.—[*Inrolled in the Inrolment Office, January,* 1838.]

To JOHN REYNOLDS, *of Oakwood, near Neath, in the county of Glamorgan, iron-master, for his invention of an improved steam engine and apparatus, to be worked by steam and other motive power.*—[Sealed 9th June, 1833.]

THIS invention, which is described in the title of this patent as an improved steam engine, consists of the follow-

ing parts; firstly, an improved steam boiler, in which the flues are constructed of tubes placed angularly to each other, their extremities ending in spherical boxes or "bulbs," against which the heat, as it passes through the flues, impinges, and thereby a greater quantity of steam is produced from a given quantity of fuel than by any other arrangement of steam boiler; and also a method of uniting the boiler plates by dovetailing them into each other, and then rivetting a plate over the junction. Secondly, in an improved rotary high-pressure steam engine, in which the steam is made to act upon many parts of the engine, and thereby render it steam tight. Thirdly, in a certain arrangement of apparatus, by means of which the steam escaping from the rotary high-pressure engine before mentioned may be conveyed to another engine, in order that its expansive force may be again used for generating power. Fourthly, in a new air engine, combining many of the parts of the steam engine before mentioned. Fifthly, a new water engine, or lift pump, also combining many of the parts of the rotary steam engine. Sixthly, in an improved metallic packing; and, seventhly, in what the Patentee calls a spring clutch box, for the purpose of preventing any injury that might otherwise arise from the vibration, or any shocks or accidental alteration in the centre of motion of the working or other shafts.—[*Inrolled in the Inrolment Office, June,* 1833.]

To HENRY NEEDHAM SCROPE SHRAPNELL, *of Bayswater-terrace, in the county of Middlesex, Esq., for his invention of certain improvements on snuffers.*—[Sealed 11th January, 1837.]

THIS invention consists in the application of a series of spikes or projections to snuffers, amongst and between

which the snuff taken from the candle is forced by the act of snuffing, and securely retained there, so that when the nuffers are used a second time, the snuff is not so liable to ll out as it is in the construction of snuffers now in eneral use; and in addition to this advantage, the snuffers, nstructed according to this invention, may be more easily eared of the snuff. The spikes or projections are fixed the left hand side plate of the snuffers; and in a groove the surface of this plate a female screw is made, by ich the plate is attached to the snuffers, there being nale screw formed on the corresponding part of the ffers, on to which the side plate is screwed. As the kes or projections extend from the back of the internal of the snuffers, it will readily be understood that as snuff is passed into the box in the act of snuffing, it will essed in among the spikes, and be consequently securely ned by them until the box is full, when the accumu- n may be easily removed by unscrewing the back side e, which will bring the snuff with it; and the snuff may eadily withdrawn by using the end of the snuffers or other pointed instrument to remove it from between spikes or projections.

The Patentee says, in conclusion, that he lays no claim any of the parts of the snuffers when not combined with s improvements; and he would also state that the snuffers may be made in a variety of shapes, and the spikes or projections may be attached to the side plate in many different manners, without departing from the invention; for instance, instead of making the box or case of a round form, as shown in the specification, it may be constructed of an oval or square form: the plate may also be secured by a catch instead of a screw; but he claims as his invention the application of a series of spikes or projections ers, amongst which the snuff is pressed and retained.

[*ed in the Inrolment Office, July,* 1837.]

To THOMAS DON, *of Lower James-street, Golden-square, in the city of Westminster, millwright and engineer, for certain improvements in machinery for the preparation of farinaceous substances, and in the processes of making bread; portion of which improvements were communicated to him by a foreigner residing abroad.*—[Sealed 8th March, 1833.]

THIS invention is divided into four parts, consisting, firstly, of an improved mode of drying grain; secondly, in improvements in apparatus for grinding; thirdly, an improved apparatus for preparing the dough; and, fourthly, in improvements in apparatus for baking bread and biscuits.

Although the invention is described at considerable length, it does not appear to differ very widely from other inventions of a similar nature. The apparatus for drying the grain seems to be the only part that possesses any decided degree of novelty. It consists of a close chamber, constructed in such a manner, that it may be heated by means of steam. This chamber may be heated by steam pipes passing through it, or by being entirely surrounded by steam. To the steam pipes, chambers, or other heated surfaces, are attached metal shelves, inclining downwards, and projecting over each other, for the purpose of obstructing the grains in its descent through the heated chamber. The grain being fed into the top of this chamber by means of a hopper, it falls on to one of the metal shelves, and sliding from this, drops on to the one projecting from the opposite side, and thus pursues a tortuous or zigzag direction, falling from one shelf to another, until it gets to the bottom.

It will be readily understood, that as the shelves are attached to the steam pipes or chambers, they will soon become heated, and the aqueous particles will be driven off from the grain. The shelves prevent the grain from

descending too quickly, and retain it in contact with the heated surfaces until it becomes dry. A pump may be attached to this apparatus for drawing the vapour.—[*Inrolled in the Inrolment Office, September,* 1833.]

To CHARLES HANCOCK, *of Grosvenor-place, Hyde-park, in the county of Middlesex, animal painter, for his invention of certain improved means of producing figured surfaces, sunk and in relief, and of printing therefrom, and also of moulding, stamping, and embossing.*—[Sealed 25th January, 1838.]

THIS invention is divided into eleven distinct heads; the first eight are different modes of etching and preparing metal plates so as to produce the effect of light and shade. The metal plates are first to be prepared in the manner in which engravers prepare plates for mezzotinto work, when so prepared, some parts are scraped down to give light effects; and when a very brilliant light is wanted, then the engraver is to cut into the plate very deeply. Impressions are taken from these plates in the same manner as from type. The mezzotint ground may be obtained by placing a sheet of glass paper on the plate, and passing it through a press, or in any other convenient manner.

Another part of this invention is for printing or ornamenting leather, which may be made into gloves. This is effected by saturating a piece of bobbin net or lace in a coloured solution, and after distending it over the leather, submitting them both to considerable pressure, when the colour will become transferred to the leather. The next head is for a method of transferring patterns to china, glass, and earthenware, by means of an elastic mould, made of caoutchouc, or of a mixture of glue and treacle, as the

inking rollers of a printing press. The caoutchouc, or mixture to be used, is reduced to a fluid state, and a cast is to be taken with it of any design or pattern to be transferred in the manner in which stereotype is now done. The mould thus obtained will be in reverse, and the figured part is to be covered over with a coat of varnish, and by means of a slight pressure it is applied to the glass or porcelain. Those parts of the surface of the glass answering to the pattern or design in the mould, are consequently left unprotected by the varnish. The pattern is then to be etched in by means of fluoric acid. The same means are employed to transfer patterns or designs to stone, except that a nitric acid in a diluted state is used. The last head of the invention is for a method of colouring or printing in colours. The Patentee draws the outline of the pattern to be printed, and then obtains as many copies of the same on cloth or cambric, as there are colours in the design. He then stops out with varnish or sealing wax, dissolved in spirits of wine, all those parts which are not intended to be printed in the first process. For instance, he stops out all those parts in the first outline which are not intended to be blue, and the next, all those that are not intended to be yellow, and so on. He then proceeds to print in the following manner:—The first copy is laid down upon the paper, and the blue colour forced through the cloth in all those parts which are not stopped out by varnish or wax. The next outline copy on cloth is then laid on the paper, and the yellow colour is forced through in the same way, and so on until all the colours are transferred to the paper.

The Patentee says, that this part of the invention is particularly applicable to paper hangings, or any other work, where a large body of colour is required; and it is also applicable to the fine arts.—[*Inrolled in the Inrolment Office, July,* 1838.]

To JOHN WISKER, *of Vauxhall, in the county of Surrey, potter, for his invention of certain improvements in machinery or apparatus for grinding covers or stoppers for jars, bottles, or other vessels made of china, stone, or other earthenware.*—[Sealed 11th December, 1833.]

THIS invention is a peculiar arrangement of machinery, by means of which stoppers or covers may be fitted to several bottles or jars at the same time. This is effected by means of spindles, having a rotary motion of considerable velocity given to them; the stoppers or covers to be fitted to the bottles being attached to the ends of the spindles. The stoppers or covers thus attached are placed on, or in, the necks of the bottles or jars, which are securely fixed and accurately adjusted on a table; and a quick rotary motion is given to the spindles by any convenient mechanism, such as a spur wheel or band wheel. By this means, it will be readily understood that any number of jars or bottles may be accurately fitted with stoppers; and if it should be found necessary, a small quantity of very fine grit mixed with water may be used.—[*Inrolled in the Inrolment Office, June,* 1834.]

To NICHOLAS TROUGHTON, *of Broad-street, in the city of London, gentleman, for improvements in the process of obtaining copper from copper ores.*—[Sealed 21st August, 1838.]

ACCORDING to the ordinary mode of treating copper ores in obtaining copper therefrom, the ores are subjected to the processes of roasting, and the vapours produced therefrom are permitted to pass into the atmosphere; and it is well known that some of such vapours are produced from the sulphur contained in the ores.

Now the object of my invention is, to obtain sulphur in the process of roasting ores, in place of permitting the vapours thereof to pass into the atmosphere; and, secondly, my invention relates to the obtaining of sulphuric acid by the combustion of vapours produced in roasting copper ores in the processes of obtaining copper therefrom. And in order to give the best information in my power for carrying out this my invention, I will describe the means pursued by me.

In place of submitting the ores to heat in reverberatory furnaces, as is the most usual practice, and whereby the vapours distilled from the ores mix with those given off and produced by the fuel, I place the ores in retorts, which are externally heated in a similar manner to what is described in my former patent; and thereby I am enabled to obtain the vapours from the ores free from the vapours of combustion of the fuel employed, as will readily be understood on examining my former specification. When I wish to obtain sulphur, I conduct the ends of the pipes leading from the retorts containing the ore into a chamber or vessel, which I prefer to be of brick lined with fire clay; and I construct such vessels about ten times the contents or dimensions of the retorts used: and there is to be a door or opening through which a person can get to throw out the sulphur deposited, but such door is to be closed as air-tight as possible when at work with the retorts and vessel.

In roasting the ores to obtain sulphur therefrom, care is to be observed to admit as little air into the retorts, or any parts of the apparatus, as possible, in order to prevent the formation of sulphurous acid; and the vapour distilled will pass into the chamber or vessel, and quickly condense and fall in the form of sulphur, which may be removed at any time by shutting off the flow of vapour into the chamber,

and opening the door and well ventilating the chamber with fresh air: a man may then enter, and remove the sulphur.

When it is desired to make sulphuric acid in the act of roasting copper ores, in the process of obtaining copper from such ores, I put the ores into similar retorts to those above mentioned, from which the vapours distilled are conducted by suitable pipes to vessels suitable for making sulphuric acid, as is well understood in making sulphuric acid by sulphurous acid, in place of letting such sulphurous acid escape into the atmosphere in combination with the products of combustion of the fuel employed. The requisite leaden vessels and apparatus employed in making sulphuric acid being well understood, and in its separate condition forming no part of my invention, it will require no description in this my specification, my invention relating only to the beneficially using the vapours distilled from sulphuretted copper ores, in the process of roasting such ores for the purpose of obtaining copper therefrom. And I would remark, that in order to produce sulphurous acid from the sulphur contained in the ores, an opening, such as is described in my former patent, should be formed in the door or cover of the retort, in order that the atmospheric air should pass therein; or in place of air, steam may be employed, as is well understood.

Having thus described the nature of my invention, and the manner of performing the same, I would remark that I do not claim the separating the vapours distilled from the ores from those produced by the fuel employed, that having been done by my former invention, by which I brought such separated vapours to be operated upon by water; but what I claim as my invention is, first, the mode herein described of obtaining sulphur in the process of washing copper ores by causing the separated vapours distilled therefrom to enter a chamber and deposit sulphur

therein; secondly, I claim the combining the processes of making sulphuric acid with that of roasting copper ores, as above described, whereby I am enabled, in both cases, to obtain valuable products in place of their being driven into the atmosphere to the prejudice of the surrounding neighbourhood.—[*Inrolled in the Inrolment Office, February*, 1839.]

SCIENTIFIC ADJUDICATION.

ROLLS' COURT, JUNE 24, 1839.

CORNISH AND SIEVIER *v.* KEENE AND NICKELS.

This was a motion for an attachment against the defendants for having infringed the plaintiff's patent rights, in contempt of the order and injunction of the Court.

The patent was granted to the plaintiff, Sievier, for improvements in the ordinary *elastic webs*, used in the manufacture of *braces*, *garters*, riding belts, stays, *gloves*, &c. &c. One of the improvements consisted in placing strands on threads of India rubber, covered or wound round with filaments of cotton, silk, or other fibrous material alternately with cotton or other threads, either in the warp or woof.

The plaintiffs being jointly entitled to the patent, filed their bill against the defendants in 1834, for an infringement; and after the validity of the patent was established by the judgment of the Court of Common Pleas, and affirmed by the Court of Exchequer Chamber in error, this Court granted an injunction against the defendants, restraining them from further infringement.

Mr. Pemberton, with whom was Mr. Kindersley and Mr. Torrians, moved for an attachment against the defendants for infringements, by selling webs made according to the plaintiff's patent.

In one case of infringement the India rubber threads were covered by a braiding machine, but the defendants swore that the piece of web had been sold by mistake.

In the other infringement, the India rubber threads were not wholly covered, the filament of cotton being wound round in a spiral form.

Mr. Tinney, with whom was Mr. Dixon and Mr. Corrie, showed cause, and contended that the first infringement was unintentional, and sold by mistake; and that the other alleged infringement was no infringement at all; and asked for a trial at law.

The Master of the Rolls in giving judgment said, he thought it was not sufficient to take the article out of the patent, that it was not entirely covered, and that it was an infringement of the patent. And his lordship ordered an injunction against the defendants manufacturing any webs with the thread partly covered in the way they had done, and refused to grant a trial at law.

His lordship being of opinion that the defendants had acted under a mistake, did not commit them, but ordered them to pay the costs of the application.

ORIGINAL COMMUNICATION.

(To the Editor of the London Journal of Arts.)

Sir,—Observing a number of blocks of wood lying in the Old Bailey, evidently prepared for forming a wooden pavement for the carriage way, opposite the Sessions-house, and finding the blocks vary greatly in dimensions, I measured several of them, and found some only eight inches and a half long, while others were nine inches and three-eighths. They are generally of the figure of a regular hexagonal prism, some of them, however, are a little conical; but the diameters vary so much, that it will be impracticable to fit them together without leaving interstices between them so great, as to render the outer parts of the blocks liable to be chipped off by the feet of the horses and the wheels of the carriages passing over them.

The surface, too, of the ends of the blocks, each of which ought to be cut off exactly at right angles to the axis of the

prism, forms, in many cases, oblique angles with that axis, and consequently, when the blocks are laid down, one side will be higher than the other, and thus the pavement will necessarily have an uneven surface, and much of the value of the wooden pavement be lost.

Having attentively watched for about four years, from 1827 to 1831, the effect of much travelling over a piece of wooden pavement well executed in the principal gateway of Vienna, and observed that it appeared to wear away much less than any other kind of pavement, I frequently, after my return to England, mentioned to our engineers the superiority of this kind of pavement, and recommended its universal adoption.

But the goodness and durability will depend on the excellence of the workmanship; the blocks ought all to be cut exactly to one gauge, and laid on an even bed. I should consider a difference of a tenth of an inch in either length or breadth sufficient to disgrace any engineer who would permit such blocks to be laid down contiguously. How great then must be my disgust at observing near an inch difference in the lengths, and more than an inch in the breadths of those blocks about to be used for the pavement in the Old Bailey.

Being thoroughly satisfied that neither comfort nor durability can possibly result from such excessively bad workmanship, and apprehensive that the numerous benefits and great economy of wooden pavements will, for a length of time, be lost to the community, if such a wretched specimen be allowed to influence public opinion, I deem it my duty to warn all those concerned, against a proceeding which can only produce disappointment and public injury.

I am, sir, your obedient servant,

JOHN ISAAC HAWKINS.

London, July 24, 1839.

[We have not seen the blocks of wood referred to by Mr. Hawkins, but should presume, from his description of them, that the pavement will be laid down upon the principle of Mr. Stead's patent, see page 325, present number.—ED. LOND. JOUR.]

SCIENTIFIC NOTICES.

REPORT OF TRANSACTIONS OF THE INSTITUTION OF CIVIL ENGINEERS.

(Continued from p. 266.)

February 19, 1839.

The PRESIDENT in the chair.

Mr. Pellatt remarked, that regard was to be had to the manner in which the coke was consumed. He had seen, in Lancashire, a glass manufactory worked by four coke ovens, the pots being placed above them. The ovens were not of the ordinary nature in London, but holding only two tons, with flues by the side to take in air from the atmosphere. The coal was bad, and the coke not taken an accurate account of. But it was stated that a ton of coal only produced 10 cwt. of coke, whereas with us it produces 14 cwt.; thus there was a loss of 4 cwt. In the ordinary process the ovens are drawn once every twenty-four hours; here they are drawn more frequently, and small coal is supplied till the time of their being drawn. To this some of the loss might be attributed.

Mr. Lowe remarked the difficulty of ascertaining the specific gravity of coke; you could not be certain of its being saturated. The best means with which he was acquainted, was to place it under the receiver of an air-pump, so as to be sure of all the air being withdrawn, and every vesicle filled with water: perhaps boiling is the next best. At first, gas coke floats; thus, pumice stone which floats, consists of exceedingly heavy particles when comminuted.

"On Railways in America." Communicated in a letter to the President, by S. W. Roberts.

The writer describes the various methods which had been adopted of laying down railways in America during the last twelve years. First, timber rails with light flat iron bars were tried; these were found cheap, but not durable. Next, stone rails or sills similarly plated; next, heavy iron rails laid on blocks

of stone: the violent vicissitudes of the season soon deranged the foundation of these, and caused the track to spread. The heavy iron rails were next laid on a foundation of timber. The Alleghany Portage Railroad was laid four years ago by the writer, with hewn white oak timber, 10 inches square, imbedded in the ground; upon these cross sills of locust timber, 6 by 8 inches, and $7\frac{1}{2}$ feet long, notched and trenailed. On the top of these cross sills, and directly over the longitudinal timbers, the cast iron chairs which supported the rails were bolted. The track was thus effectually prevented from spreading. The rails are from 45 to 60 lbs. per yard, from 3 to $3\frac{3}{4}$ inches in height, and from $3\frac{1}{4}$ to $4\frac{1}{4}$ inches on the base. On roads with difficult curves, "bogie" engines are used. Each locomotive has six wheels. The hinder part is supported by a pair of driving wheels, 4 to 5 feet in diameter, and the front part rests upon a bolster on the bogie, which has four wheels of about 33 inches diameter. Each passenger car is 36 feet long, and holds fifty persons, and warmed by a stove. The long cars are adopted as less likely to upset than those on six wheels. The average speed, including stoppages, is 15 miles per hour.

"Manchester and Leeds Railway Section." By Francis Whishaw, M. Inst. C. E.

This section prepared under the direction of Mr. Whishaw, is designed to afford a novel and useful method of embodying a great mass of the details required by an engineer when giving evidence before a Parliamentary Committee. This section was constructed before the last standing orders, and the author had here anticipated them in putting upon this section much of the detail now required. By sections thus prepared, the engineer can always answer any questions which may be put to him.

"Account of Boring for Water through Granite." By Frederick Holland. Communicated by Apsley Pellatt, A. Inst. C. E.

A hole, 6 feet wide and 7 feet deep, was first dug, and a wooden cylinder, lined with bricks, inserted. Two pieces of cast

iron pipe, 6 feet in length and 8 inches in diameter, turned smooth at both ends, and united by a wrought iron hoop ring, so that when the whole number of pipes were driven, a continuous pipe, perfectly cylindrical, both on the inside and on the out, was formed. Nine lengths of pipe were connected and driven, and then the boring commenced, and continued through a hard rich species of rock or granite, having all the component parts, but not the compactness of granite. The boring was continued to a depth of 175 feet. The supply has been regular at the rate of from 48 to 50 gallons per minute, a temperature of 48° F., the external air being 52½° F.

Mr. Brunel stated that the advance of the Thames Tunnel was now at the rate of three feet per week; they were now 64 feet from low-water mark. He presented some specimens of sand, which, when mixed with a certain quantity of water, was exceedingly troublesome. They frequently push the poling boards before them: last night, not less than 60 square feet was pushed before them. They fight their way on with difficulty, but continuously.

February 26, 1839.

The President in the chair.

"On the Economy of working expansively in Crank Engines." By John Watt.

A letter from Mr. Watt was read, on the economy produced by working steam in large steam engines expansively, in which the author details the results of some experiments on a high pressure engine, employed for blowing furnaces. The steam cylinder of the engine in question was 38 inches in diameter, the blowing cylinder 122 inches, length of stroke 9 feet, pressure on the piston as shown by indicator diagrams 41 lbs., and in the boiler 45 lbs. per square inch, the number of strokes about 12 per minute, and the pillar of blast 2½. A large fly-wheel was attached, and on fitting the steam engine with an expansive apparatus and cutting off at half-stroke, the performance was greater

than at any previous time, and with a saving of 25 per cent. of fuel. The author refers this to the fact that all the moving parts, with the exception of the fly-wheel, are brought to a state of rest at the conclusion of each stroke; and that if the steam be allowed to enter throughout the whole length of stroke, the piston will have to draw from the fly-wheel momentum sufficient to overcome the momentum, and to alter the direction of the reciprocating parts; but the steam being cut off so that the momentum is destroyed by the time the piston terminates its stroke, the return stroke will be commenced without checking the unnecessary impetus which exists when the steam is admitted to the end of the stroke. Thus it is observed, that engines working expansively pass the centres more easily than when working full pressure throughout the stroke. The momentum which has to be destroyed is created at the expenditure of more than half a cylinder full of steam; and the checking this motion is also accompanied by a still further waste of steam. Mr. Watt had altered an engine, driving rolls for rolling iron, and the result of cutting off at half-stroke was here also attended with a saving of 25 per cent. of fuel.

In the preceding paper, part of the good results of the Cornish engines was attributed to the momentum of the column of water. Mr. Enys explained that the quantity of water is small as compared with the mass of the pump rods: in the Cornish engines this mass of matter is put in motion by a violent jerk; the proportion of weight of the pump rods to the weight of water is about 150 tons to 37 tons. He believes that one cause of the economy of working expansively is, the boiler room not being sufficient when the boiler works at full. There is an immense superiority in the working of an engine which has abundance of boiler power, over the working of one in which this is deficient: The high-pressure boiler never evaporates as much water as the low-pressure boiler, the circumstances being the same. There were many curious facts connected with the evaporation and the duty. It sometimes happened that the duty was less for a greater quan-

tity of water supplied to the boiler; this must be referred to leakage. Another difficulty which he had experienced was in making the theoretical diagrams come up to the indicator dia grams; this might be owing to the piston not following the pressure with sufficient quickness.

List of Patents

Granted by the French Government from the 1st of April to the 30th June, 1838.

(Continued from p. 271.)

To Jean Baptiste Brackman, of Paris, for a small mechanism, principally used for head dresses, called *imperceptible.*

— Jean Baptiste Lebeau, of the Château de Godet, represented in Paris by M. Perpigna, for improvements on his excavator.

— Vital Fage, of Bordeaux, for a mechanical bed.

— Lelong Burnet, of Paris, for a new kind of jewellery.

— Serveille, sen., of Bordeaux, for a new system of wheels for railroads, called *Serveille system.*

— Jean Baptiste Gillard, of Paris, for a new steam engine.

— Edouard Champonnois, of Arras, for a new system for making indigenous sugar.

— Jean Pierre Pageau, of Paris, for new mill-stones.

— Henry Smith, of Birmingham, for improvements in oil or gas lamps.

— Jacques Louis Théodore Vinet-Buisson, of Montmirail, for several machines set in motion by a tumbling lever.

— Jean Marie Aulnette, of Paris, for a new method of paving.

— Joseph Chenus Gilles, of Chalons sur Saône, for a machine for manufacturing pipes for stoves.

— Antoine Joucla, of Perpignan, for a machine to bruise olives, applicable to several mechanical arts.

— Désiré François Le Roy, of Rouen, for a new means of accelerating steam boilers and others.

— Joseph Espinasse, of Bordeaux, for an improvement in machines used for separating the grapes from their stock.

To Benjamin Geslin, of Paris, for iron beds and chairs called "Geslin beds and chairs."

— Moses Poole, for divers improvements in the construction of carriages for rail and ordinary roads.

— Toussaint Richard, of St. Foix les Lyon, for a means of making rails for railroads.

— Henri Cavallier Lions, of Grasse, for improvements in the ovens used to suffocate cocoons.

— Edward Antoine Brisbart Gobert, of Montmirail, for a new kind of click and ratchet wheel.

— Charles François Lejenne, of Paris, for improvements in guns.

— Juste Heintz, of Paris, for an economical method of cutting cloth for pantaloons.

— Nicholas Saintard, of Paris, for improvements in the buckles and slides of suspenders.

— James Buchanan, of Glasgow, for improvements in the spinning of flax.

— Edward Stollé, of Paris, for a new process of making beet root and other sugars.

— Auguste Etienne Capdeville, for improvements in the refining of sugar.

— Louis Japy, of Berne, for a mechanical ram.

— Aimable Jozin and Charles Michel Hardy, for a new kind of ornamental pole for the hanging of rooms.

— James Irving, for a new method of making signals, by means of electricity.

— Louis Bassuet, of Bordeaux, for a new liquor called *sovereign stomachic liqueur*.

— Joseph and Henry Adolphé Couteaux, father and son, of Joinville le Pont, for two machines for the manufacturing of oil cloths.

— Jean Baptiste Edouard Ladeuze and Jules Napoléon Symyan, of Paris, for an apparatus for the bleaching of sugar.

— Jaques Nöel Lebas, of Laigle, for metallic rings applicable to the navy.

— Charles François Lejune, of Paris, for improvements in fire-arms.

To Sterlingue and Co., of Paris, for improvements in the method used for beating thick leather.

— Julien Blanchètiere, of Paris, for a metrical compass for the use of tailors.

— Antoine Pierre Baudouin, of Paris, for a new kind of painting called *enamel painting*.

— François Halot, of Paris, for the means of making and colouring china.

— George Keichenecker, of Ollwiller, for a new apparatus to make with precision bricks, tiles, &c.

— Jean Baptiste Gauthier Lemare and Pierre Etienne Boulay, of Falaise, for an improved knitting machine,

— Jean Jacques Le Roy and Stanislas Sorel, of Paris, for a new system of making safety carriages.

— François Etienne Limmer, of Strasbourg, for an improved weighing machine.

— Victor Danglars and Magloire Augustin Julienne, of Rouen, for a brick-making machine.

— François Jules Manceaux, of Paris, for improvements in sword scabbards.

— Jean Baptiste Louis Simon, of Toulon, for a hydraulic press.

List of Patents

Granted in Scotland between 22d June and 22d July, 1839.

To Richard Beard, of Egremont-place, New-road, London, in consequence of a communication from a foreigner residing abroad, for improvements in printing calicoes and other fabrics. —Sealed 25th June.

— John Small, of Old Jewry, London, merchant, in consequence of a communication from a foreigner residing abroad, for improvements in the manufacture of thread, or yarn and paper, by the application of certain fibrous materials not hitherto so employed.—Sealed 26th June.

— James Lees, of Salem, near Oldham, cotton-spinner, for an

improvement in the machinery for spinning, twisting, and doubling cotton, silk, wool, hemp, flax, and other fibrous materials.—Sealed 2d July.

To John Arrowsmith, of Bilston, Staffordshire, civil engineer, for certain improvements in steam engines.—Sealed 3d July.

— Frank Hills, of Deptford, chemist, for certain improvements in the construction of steam boilers, and of locomotive engines. —Sealed 3d July.

— Thomas and Charles Clark, of Wolverhampton, iron-founders, for an invention for glazing and enamelling cast-iron, hollo-ware, and other metallic substances.—Sealed 4th July.

— Alexander Gordon, of Fludyer-street, Westminster, for a new apparatus for employing or using steam or other elastic fluid as a motive power, communicated by a foreigner residing abroad.—Sealed 5th July.

— James Kay, of Pendleton, near Manchester, flax-spinner, for an extension of three years from 23d June, 1839, of a patent granted to him for an invention of a new and improved machinery for preparing and spinning flax, hemp, and other fibrous substances by power.—Sealed 11th July.

— Abraham Bury, of Manchester, for certain improvements in the mode of printing, colouring, or dyeing cotton or other fabrics.—Sealed 12th July.

— Joseph Maudsley and Joshua Field, Lambeth, London, for improvements in the construction of marine steam engines, which are particularly applicable to steam engines of the largest class.—Sealed 15th July.

— Charles Sanderson, of Sheffield, steel manufacturer, for a certain improvement in the art or process of smelting iron ores. —Sealed 15th July.

— James Templeton, manufacturer, Paisley, and William Quigley, weaver there, for a new and improved mode of manufacturing silk, cotton, woollen, and linen fabrics.—Sealed 17th July.

— Pierre Auguste Ducote, of St. Martin's-lane, London, for certain improvements in the art of printing on paper, calicoes, silks, and other fabrics.—Sealed 17th July.

To John Thomas Betts, of Smithfield-bars, London, rectifier, in consequence of a communication from a foreigner, for improvements in the process of preparing spirituous liquors, in the making of brandy.—Sealed 19th July.

— David Johnston, of Glasgow, manufacturer, in consequence of a communication from a foreigner, for certain improvements in the manufacture of hinges.—Sealed 19th July.

— Moses Poole, of Lincoln's-inn, in consequence of a communication from a foreigner, for improvements in printing calicoes and other fabrics.—Sealed 19th July.

— John Fairrie, of Church-lane, Whitechapel, London, sugar-refiner, for improvements in making and refining sugar.—Sealed 19th July.

— Henrick Zander, of North-street, Sloane street, London, for improvements in steam engines, steam boilers, and condensers. —Sealed 22d July.

New Patents
SEALED IN ENGLAND.
1839.

To Richard Hodgson, of Salisbury-street, Strand, gentleman, for improvements in the forms or shapes of materials and substances used for building and paving, and in their combination for such purposes, being a communication.—Sealed 27th June—6 months for inrolment.

To Moses Poole, of Lincoln's-inn, gentleman, for improvements applicable to wheeled carriages, and in springs, being a communication.—Sealed 29th June—6 months for inrolment.

To Henry Pape, of Little Newport-street, Leicester-square, musical instrument maker, for certain improvements on stringed musical instruments.—Sealed 2d July—6 months for inrolment.

Henrik Zander, of North-street, Sloane-street, gentle-

man, for improvements in the manufacture of paper.—Sealed 2d July—6 months for inrolment.

To Charles Osborne, of Birmingham, cork-screw manufacturer, for a certain improvement or certain improvements in the construction of cork-screws.—Sealed 2d July—6 months for inrolment.

To Alexander Cochrane, of Arundel-street, Strand, gentleman, for an improved lock.—Sealed 3d July—6 months for inrolment.

To Alexander Cruckshanks, of Liverpool-street, New-road, for certain improved methods of producing or manufacturing certain inflammable substances, and of applying the heat and light obtained from certain inflammable substances to various useful purposes.—Sealed 3d July—6 months for inrolment.

To James Yates, of the Effingham Works, Rotherham, iron-founder, for certain improvements in making, forming, or producing raised or projecting letters, mouldings, figures, or other ornamental work for external decorations of buildings and other purposes.—Sealed 3d July—6 months for inrolment.

To Thomas Trench Berney, of Morton-hall, Norfolk, Esq., for certain improvements in cartridges.—Sealed 6th July—6 months for inrolment.

To Edmund John Jones, of Paulstone-house, Hereford, gentleman, and John Ham, of the city of Bristol, engineer, for an improved process of manufacturing cyder and perry.—Sealed 6th July—6 months for inrolment.

To George Philcox, of Southwark-square, watch-maker, for certain improvements in chronometers, watches, and other time-keepers.—Sealed 6th July—6 months for inrolment.

John Ericsson, of Cambridge-terrace, Hyde-park, civil-engineer, for an improved steam engine, particularly appli-

cable to locomotive purposes and steam navigation.—Sealed 6th July—6 months for inrolment.

To John Fairrie, of Church-lane, Whitechapel, sugar-refiner, for improvements in making and refining sugar.—Sealed 6th July—6 months for inrolment.

To Peter Rothwell Jackson, of Great Bolton, Lancaster, engineer, for a new and improved method of mangling, calendering, glazing, and finishing, cotton, linen, woollen, and other goods and manufactures, and certain machinery to effect the same.—Sealed 8th July—6 months for inrolment.

To Edward Francois Joseph Duclos, of Clyne-wood Works, Swansea, gentleman, for improvements in the manufacture of sulphur, sulphuric acid, and sulphate of soda.—Sealed 11th July—6 months for inrolment.

To William Woodley, of Observatory-house, Stoke Newington, captain in the navy, for improvements in propelling vessels and carriages, and other machinery.—Sealed 13th July—6 months for inrolment.

To Thomas Bell, of St. Austle, Cornwall, hotel-keeper, for improvements in obtaining copper from copper slag.—Sealed 13th July—6 months for inrolment.

To James Yates, of the Effingham Works, Rotherham, iron-founder, for certain improvements in the construction of cupola furnaces for melting metals.—Sealed 13th July—6 months for inrolment.

To Daniel Ramee, of Charlotte-street, Bloomsbury, for improvements in paving roads and such like ways, being a communication.—Sealed 15th July—6 months for inrolment.

To John Hemming, of Edward-street, Cavendish-square, gentleman, for improvements in gas meters.—Sealed 16th July—6 months for inrolment.

To John Reynolds, of Bridge-street, Blackfriars, Esq., for certain improvements in the manufacture of salt.—Sealed 16th July—6 months for inrolment.

To John George Shuttleworth, of the Mount, near Sheffield, soap-boiler, for a new mode of obtaining a rotary motion from the rectilinear motion of the piston rod of a steam or other the like engine.—Sealed 18th July—6 months for inrolment.

To Edward Brown, of Lyme-Regis, Dorset, ironmonger, for improvements in apparatus for cooking.—Sealed 20th July—6 months for inrolment.

To Thomas Nicholas Raper, of Bridge-street, Blackfriars, gentleman, for improvements in rendering fabrics and leather waterproof.—Sealed 20th July—6 months for inrolment.

To Moses Poole, of Lincoln's-inn, gentleman, for improvements in casting for printing purposes, being a communication.—Sealed 20th July—6 months for inrolment.

To Peter Robert Drummond, Lord Willoughby d'Eresby, for improvements in compressing peat.—Sealed 20th July—6 months for inrolment.

To David Johnston, of Glasgow, manufacturer, for certain improvements in the manufacture of hinges, being a communication.—Sealed 20th July—6 months for inrolment.

To Alexander Southwood Stocker, of the Union Rolling Mills, Birmingham, and Thomas Johnson, of Ridgacre Iron-works, Stafford, for certain improvements in machinery for manufacturing shoe-heels and toe-tips.—Sealed 20th July—6 months for inrolment.

To John Charles Schwieso, of Albany-street, Regent's-park, harp-maker, for certain improvements in the con-

struction of locks.—Sealed 20th July—6 months for inrolment.

To Charles Flude, of Liverpool, chemist, for certain improvements in the manufacture of white lead.—Sealed 20th July—6 months for inrolment.

To John Frederick Myers, of Albemarle-street, Piccadilly, musical instrument maker, and Joseph Storer, of Bidborough-street, New-road, musical instrument maker, for certain improvements in the construction of certain musical instruments, part of the said improvements being applicable to those of the kind commonly called piano-fortes, and part of those kind commonly called seraphines; and to certain descriptions of organs, being partly a communication.—Sealed 20th July—6 months for inrolment.

To Joshua Crockford, of Litchfield-street, Soho, gentleman, for an improved mode of applying cotton and other wicks to tallow and other the like substances used for candles, in order to consume the same.—Sealed 20th July —6 months for inrolment.

To John Hanson, Rashcliffe, York, patent lead pipe manufacturer, for certain improved apparatus for measuring and registering the quantity of gas, water, or other fluid passed through the same.—Sealed 24th July— 6 months for inrolment.

To James Kay, of Pendleton, near Manchester, cotton-spinner, of an extension for the term of three years from the 26th July, 1839, of an invention for a new and improved machinery for preparing and spinning flax, hemp, and other fibrous substances by power.—Sealed 24th July.

To James Templeton, manufacturer, in Paisley, and William Quigley, weaver, in Paisley, for machinery for a new and improved mode of manufacturing silk, cotton, woollen, and linen fabrics.—Sealed 25th July—6 months for inrolment.

CELESTIAL PHENOMENA, FOR AUGUST, 1839.

D.	H.	M.	
1			Clock before the sun, 6m. 1s.
	—		☽ rises 9h. 56m. A.
	—		☽ passes mer. 4h. 41m. M.
	—		☽ sets 0h. 2m. A.
			☽ in Perigee.
2	9	49	☽ in □ or last quarter.
3			Gambart's Comet R. A. 8h. 40m. dec. 12. 48. N.
			Ditto passes mer. 23h. 54m.
5			Clock before the sun, 5m. 44s.
	—		☽ rises morn.
	—		☽ passes mer. 8h. 26m. M.
	—		☽ sets 5h. 37m. A.
	9	28	☿ greatest elong. 27. 20. E.
7			Gambart's Comet R. A. 8h. 59m. dec. 11. 9. N.
			Ditto passes mer. 23h. 57m.
8	6	44	♄ stationary.
9	9	19	Ecliptic conj. or ● new moon.
10			Clock before the sun, 5m. 9s.
	—		☽ rises 5h. 37m. M.
	—		☽ passes mer. 1h. 1m. A.
	—		☽ sets 8h. 6m. A.
11			Gambart's Comet R. A. 9h. 18m. dec. 9. 28. N.
			Ditto passes mer. 23h. 59m.
		30	☿ in conj. with the ☽ diff. of dec. 3. 4. S.
12	16	27	♀ in conj. with the ☽ diff. of dec. 0. 44. S.
13	17	53	♃ in conj. with the ☽ diff. of dec. 4. 9. N.
14	18	24	♂ in conj. with the ☽ diff. of dec. 3. 16. N.
15			Clock before the sun, 4m. 20s.
	—		☽ rises 11h. 44m. M.
	—		☽ passes mer. 4h. 27m. A.
	—		☽ sets 9h. 0m. A.
	14		☽ in Apogee.
17			Mercury R. A. 11h. 7m. dec. 1. 40. N.
	—		Venus R. A. 12h. 23m. dec. 5. 39. S.
	—		Mars R. A. 13h. 47m. dec. 11. 40. S.
	—		Vesta R. A. 10h. 19m. dec. 14. 38. N.
	—		Juno R. A. 1h. 29m. dec. 6. 16. N.
	—		Pallas R. A. 13h. 55m. dec. 14. 5. N.
	—		Ceres R. A. 13h. 50m. dec. 5. 36. S.
17	—		Jupiter R. A. 12h. 59m. dec. 5. 6. S.
	—		Saturn R. A. 16h. 8m. dec. 19. 13. S.
	—		Georg. R. A. 23h. 7m. dec. 6. 33. S.
	—		Mercury passes mer. 1h. 26m.
	—		Venus passes mer. 2h. 42m.
	—		Mars passes mer. 4h. 6m.
	—		Jupiter passes mer. 3h. 18m.
	—		Saturn passes mer. 6h. 26m.
	8	38	☽ in □ or first quarter.
	19	25	♄ in conj. with the ☽, diff. of dec. 7. 0. N.
18	17	9	☿ stationary.
19			Gambart's Comet R. A. 9h. 52m. dec. 6. 3. N.
			Ditto passes mer. 0h. 2m.
	4	0	♂ in conj. with Ceres diff. of dec. 6. 14. N.
20			Clock before the sun, 3m. 17s.
	—		☽ rises 5h. 23m. A.
	—		☽ passes mer. 8h. 36m. A.
	—		☽ sets 11h. 52m. A.
23			Gambart's Comet R. A. 10h. 9m. dec. 4. 21. N.
			Ditto passes mer. 0h. 3m.
	16		♂ in conj. with Pallas.
24	9	38	Ecliptic oppo. or full moon.
25			Clock before the sun, 2m. 2s.
	—		☽ rises 7h. 23m. A.
	—		☽ passes mer. 0h. 9m. M.
	—		☽ sets 5h. 23m. M.
26	19	18	♀ in Aphelion.
27			Gambart's Comet R. A. 10h. 25m. dec. 2. 40. N.
			Ditto passes mer. 0h. 3m.
	2	46	☿ greatest Hel. Lat. S.
	12		☽ in Perigee.
	13	23	♄ □ ☉
29	23	56	♀ at greatest brilliancy.
30			Clock before the sun, 0m. 18s.
	—		☽ rises 9h. 20m. A.
	—		☽ passes mer. 5h. 20m. M.
	—		☽ sets 2h. 13m. A.
	18	28	☿ in conj. with Vesta.
31	2	8	☽ in □ or last quarter.
			Gambart's Comet R. A. 10h. 40m. dec. 1. 2. N.
			Ditto passes mer. 0h. 3m.

Eclipses of Jupiter's Satellites not visible at Greenwich this month.

J. LEWTHWAITE, Rotherhithe.

THE

London

JOURNAL AND REPERTORY

OF

Arts, Sciences, and Manufactures.

CONJOINED SERIES.

No. XC.

Recent Patents.

To John Winrow, *of Gunthorpe, in the county of Nottingham, mechanic, for his invention of certain improved means of and apparatus for destroying weeds and insects on land.*—[Sealed 8th November, 1838.]

The object of this invention is, in the first place, more effectually and economically to destroy or exterminate weeds, either in the state of roots or plants, growing in the ground, or as seeds remaining therein; as also insects, or their eggs, at the time the land is being tilled, or prepared for sowing or planting the crop: and, in the second place, to destroy certain flies or insects which infect or damage the crop when it has sprung up or grown above the ground; for instance, the turnip-fly and other insects which prey upon the young plants of the crop when they appear above the surface of the land; and consists in the novel application of, or means or method of applying

heat or hot air, or a blast of heated air or steam, either separately or combined together, or even commixed with any chemical gas or vapour for effecting the above objects and purpose; and also in certain novel or improved apparatus or machinery, whereby the said hot air, steam, or gas is generated, and brought into contact with the weeds and insects intended to be destroyed, that is to say, the apparatus is portable or locomotive, and capable of being drawn over the land intended to be cleaned either by manual labour or other power. The apparatus, in the first place, consists of a carriage or framework supporting a fire-place, wherein the heat is to be generated; also, if necessary, a blowing apparatus (as rotary fans or bellows), for producing an increased heat and a blast of hot air, together with a boiler, properly supplied with water, for the purpose of generating steam; and when weeds are to be removed from the ground, the apparatus may be furnished with rollers for breaking up the clods or lumps of earth, and also with harrows, pickers or hoes, for stirring up and disturbing the same, and dragging the weeds out of the land, and exposing them, as well as the insects and their eggs, to the destructive action of the hot air or steam which is directed upon them as the apparatus passes over the land.

In the second place, the apparatus is more particularly applicable to such crops as are sown in rows or drilled, and is constructed without the rollers or harrows; and is to be passed over the young plants of the crop without injury to them, but having jets or streams of hot air or steam issuing from out of the apparatus between the rows of plants; whereby the flies or other winged insects which are preying upon or injuring the plant are disturbed by the apparatus passing over the ground, and brought into contact with the hot air or steam, and thereby destroyed. This effect will be more particularly seen by the turnip-flies,

which leave the young plants when disturbed, and fly off to the ground on either side of the rows, where they will be sure to fall under the destructive power of the jets of hot air or steam issuing from the apparatus.

In order that my invention may be better understood, I have shown three different arrangements or modifications of apparatus whereby my improvement may be advantageously carried into effect, although I do not mean or intend to confine myself to the precise arrangements or constructions therein shown, as the same may be varied either in size or arrangement of the parts to suit the purposes for which the same is designed.

Fig. 1, Plate XVI., is a side elevation of one arrangement and construction of apparatus for tilling or preparing land previous to sowing or planting the crop, and is intended to be drawn by horse power; fig. 2, is a plan or bird's-eye view, and fig. 3, is a vertical section, taken through the same, to show the interior: *a, a,* is the framework of the carriage; *b, b,* the running wheels; *c,* is a roller, serving the twofold purpose of rolling over the ground and breaking up the clods or lumps of earth, and supporting the fore part of the apparatus: this roller is mounted in the moveable framework *d,* which is constructed so as to allow the roller to "lock" or move out of the direct line as the apparatus is turned round at each end of its passage across the land: *e,* is the fire-place or furnace which, in this instance, is placed within the steam boiler *f, f,* which is supplied with water through the funnel-valve *g,* from a tank or reservoir placed on the top part thereof, or by any other convenient means: this valve also serves as a safety valve, and may be weighted to any degree of pressure required; *h,* is a rotatory fan or blowing apparatus, placed within the casing *i,* and set in motion by a band or chain *j,* passed from a large pulley *k,* on to a

smaller pulley *l*, mounted on the axis of the rotatory fan. The pulley *k*, is set in motion by other bands or chains *m*, *m*, passed around small pulleys *n*, *n*, on the axis of the pulley *k*, and also over other pulleys *o*, placed on the side of the driving wheels, or on their axis: *p*, *p*, are the two or more sets of rotatory harrows or pickers, which pass into and disturb the ground, and draw out therefrom the roots of the weeds, and submit them, together with insects or their eggs, to the action of the hot air. These harrows are mounted in an adjustable frame or carriage *q*, *q*, which is so constructed as to be capable of regulating the depth which the harrows or pickers shall pass into the ground.

These harrows or pickers may be set in motion in any convenient manner, either by a pulley and chain, or bands, or by studs and anti-friction rollers, as shown in the drawings. The rollers *r*, *r*, being placed upon the inner side of one of the running wheels, and acting upon the studs *s*, *s*, placed around a boss on the end of the axle *t*, of one of the rotatory harrows, upon which a pulley is mounted, having a band or chain passed over it to another pulley on the axis of the other set of harrows, whereby they have also a rotatory motion given to them, and are made to strike into the ground and disturb the earth, and draw out and expose the weeds and other extraneous matters to the action of the blast of hot air coming from the fire-place *e*, the same being directed by the tuyere pipes or apertures *u*, passing from the casing of the rotatory fans into the fire-place, the hot air being guided or conducted down to the ground by the side casing *v*, and top door *w*: by these means the heated air is partially enclosed, and kept or confined so as to act direct upon the weeds, &c. while under the action of the harrows, whereby they will be destroyed; and as a further means of ensuring the destruction of the insects and weeds, a steam pipe *x*, is passed from

the boiler into a horizontal branch *y*, extending the width of the apparatus. This horizontal branch is pierced with small holes, for the purpose of allowing jets of steam to rush out upon the ground, and complete the destruction of the weeds and insects: A, is a hanging flap or shutter capable of giving way to any inequalities, as clods of earth, &c. This apparatus may be constructed without the steam boiler, if desired, and only the hot air or blast applied for the purpose intended.

Fig. 4, is a side elevation of another arrangement and construction of apparatus for effecting the same objects, and being made on a smaller scale, is intended to be drawn by hand: fig. 5, is a vertical section taken through the same. In this apparatus the steam boiler is made independent of the carriage and fire-place, as shown detached in fig. 6; and when desired, the open fire-place may be used separate, as seen in fig. 7, so as to completely consume the weeds or other matters as it is passed over the land, the weeds being raked together after being drawn out of the ground by the harrows or pickers, and have been submitted to the partial action of the open fire below the bars.

The pressing roller, in this instance, is placed behind the running wheels, which are mounted in a locking carriage to facilitate the turning round of the apparatus; and also the steam pipe is furnished with a hollow joint, to allow of the horizontal jet being placed nearer to or further from the ground, as desired, for the better effecting the destruction of the insects. And in order that the apparatus may be rendered more generally useful as an agricultural instrument, it may be used without either boiler or fire, for harrowing and rolling the land after the crop of seed has been sown, or even for rolling land only, which may be done by preventing the harrows or pickers from

revolving, by means of a catch and ratchet wheel, as at *z*, or in any other convenient manner. In other respects, the same letters are marked upon similar or corresponding parts as in the former figures, and therefore it will not be necessary for me to recapitulate the description thereof, as any competent person will understand the apparatus from inspecting the drawings.

Fig. 8, is a side elevation; fig. 9, a plan view; and fig. 10, a vertical section of another arrangement and construction of apparatus, whereby the second object of my invention may be obtained, viz., the destruction of certain flies or insects without injury to the young plants of the crop, and is intended to be drawn over the land by hand or horse power, and is to be made of such capacity or dimensions as will best answer the purpose: *a, a,* are the running wheels, which are intended to be placed at such distance apart, that they will travel in the space between any two rows of plants; and the apparatus is intended to extend over as many rows as it may be found convenient to operate upon at one time, to ensure the complete destruction of the insects infecting them.

This apparatus consists of the fire-place or fuel chamber *b*, mounted on wheels or a carriage, in any convenient manner, and is furnished with the rotatory fans or blowing apparatus *c*, for producing the blast, and exciting the combustion of fuel. These fans are set in motion by pulleys and bands, or chains, as before described, and force the hot air through the fire-place down the moveable channels or troughs *d*, on to the ground, which issuing out between the rows of plants of the crop, destroys the insects which are there, or come within its action, as they are disturbed by the apparatus passing over the land.

The hot air troughs *d, d,* are placed with their mouths open to the fire-place to receive the hot air, and swing upon

joints or a rod at *e*, so as to allow of their exit ends moving up and down, to accommodate themselves to the inequalities of the ground: *f*, is a door fitted with hinge joints, for the purpose of preventing the escape of hot air, and causing it to pass down the pipes or channels *d*. And in order for better or more effectually securing the destruction of the insects, a boiler *g*, may be applied to this apparatus, wherein steam may be generated, and passed by a pipe *h*, to the horizontal pipe *k*, from which any number of jets of steam, as at *l*, may be allowed to issue between the rows of plants, and which will effectually destroy the insects that may have escaped the action of the hot air; *l*, is a stop-cock on the steam pipe; *m*, the supply and safety valve for the boiler, and *n*, is the handle by which the apparatus is to be moved over the land.

Having now described my invention, and the manner of carrying the same into effect, I have to state that it will be understood by all competent persons, that any apparatus or means for generating deleterious gases may be applied to these apparatus, and the same be allowed to issue in jets in place of the steam; and that such gases may be used in conjunction with steam or hot air as before stated, the detail of which is not necessary for me to describe. And further, that hoods, or bonnets, or channels, may be adapted to the last described apparatus, for the purpose of partially enclosing the rows of plants as it is passed along; and into these hoods or channels the deleterious vapours or gases (as, for instance, the fumes arising from burning sulphur) may be thrown, which being at a low degree of temperature, will not injure or affect the vitality of the plants, but the obnoxious vapour will destroy insects with which the crops may be infected, and which would not otherwise come under the destructive operation of the

apparatus, or the jets of hot air or steam which are applied between the rows or drills.

And I wish it to be understood that I do not intend to confine myself to the precise arrangement and construction of apparatus shown in the drawings, and described in reference thereto, as the same may be varied to suit the different operations or purposes for which the same may be required or designed, and also to suit its magnitude or capability for horse or manual power. And that what I claim as my invention, secured to me by the above in part recited Letters Patent, is the novel application, or novel mode or method of applying heat or hot air, or blast of heated air or steam, or noxious gases, for the purposes herein set forth, together with the novel or improved locomotive apparatus or machines by or in which the said hot air or steam, or gas, is generated and carried over the land, as the apparatus is passed over the ground, for the purpose of destroying the weeds and insects, and submitting them to the destructive operation of the hot air blast, steam, or noxious gases.—[*Inrolled in the Rolls Chapel Office, April,* 1839.]

Specification drawn by Messrs. Newton and Berry.

To Edward Ball, *of Finsbury-circus, in the county of Middlesex, merchant, for an invention of improvements in carriages, being a communication.*—[Sealed 3d May, 1838.]

The object of this invention is to reduce the amount of friction created in the draft of wheel carriages; and the manner in which this is effected, is by applying small anti-friction wheels or rollers to the axletrees and the boxes of carriage wheels.

The Patentee remarks, that he is aware that anti-friction rollers have been before applied to the boxes of the axletrees of wheel carriages in such a manner, that they revolve with the axletree boxes around the axletrees; but, according to this invention, the anti-friction rollers are attached to the axletree, the rollers will, therefore, remain in the situation in which they are placed, and will only revolve on their own axis.

Fig. 1, Plate XVIII., represents a transverse section of an axletree and box fitted according to these improvements: *a*, is the axletree, which has three anti-friction wheels or rollers *b*, *b*, *b*, mounted in recesses made in it; *c*, *c*, is the axletree-box, enclosing the whole, and is secured by bolts in the ordinary manner. It will be seen that the friction is very much reduced as the rollers are in contact with only a very small portion of the inner circumference of the box.

The Patentee says, in conclusion, that although he has only shown three rollers, it is evident that more may be employed, if desired, as the invention is not confined to any number of rollers, but to the mode of applying them; and he claims, as the invention secured to him, the mode hereinbefore described, of employing anti-friction rollers to reduce the friction of the axletrees of wheel carriages.—[*Inrolled in the Inrolment Office, November,* 1838.]

To JOSEPH EDEN MACDOWALL, *of No.* 257, *High-street, Borough, watchmaker, for an improvement in the manufacture of escapements for chronometers, clocks, and watches.*—[Sealed 15th November, 1838.]

ACCORDING to the ordinary modes of constructing an escapement, there is a wheel of several teeth employed, and one tooth is allowed to escape at a time, as is well un-

derstood, and on the accuracy of forming each of the said teeth, the going of the watch, chronometer, or clock, depends: hence the greater the number of teeth of such escapement wheel, must materially cause a greater difficulty in making the same with that accuracy which is desirable. Now the object of my invention is to reduce the number of impulses by which the escapement axis is caused to make a revolution, and by means of my invention such impulses may be reduced to one for each complete revolution of the escapement axis; and in no modification can an escapement, according to my invention, with advantage, exceed three impulses for each complete revolution of the escapement axis.

I would remark, that the great object of my invention is to reduce the number of impulses to obtain a revolution of the escapement axis; and a very important difference exists in any escapement made according to my invention over those previously resorted to, inasmuch as the escapement, according to my invention, has a constant movement for a considerable portion of the escapement axis; and in some cases where only one impulse is given for one revolution of the escapement axis, it is at all times in action during the complete revolution of such escapement axis, whilst in other cases the action is continuous over a half or one third of the revolution of the escapement axis, according to whether the escapement axis completes a revolution by one, two, or three impulses; all which will readily be understood on examining Plate XVII., aided by the following description:—

Description of the drawing of improvement of escapements of watches, clocks, and other timekeepers:—A, balance; B, balance axis; C, the cylinder; D, ruby fixed upon the axis; E, the inclined plane which passes around the axis, as shown in the drawing; F, screw axis; G, pro-

jecting flange of the screw, which is continued nearly once round its axis; I, locking piece fixed fast upon the hollow pinion H, and made fast upon the screw axis, so as to admit of being turned right or left; K, a bird's-eye view of the same; 1, 2, 3, 4, fig. 1, are the supposed points of contact, when the screw and the inclined plane are brought into contact with each other, as in fig. 2, which shows the correct position when working. Suppose a power to be pressing upon the pinion H; suppose, also, the lever I, to be locked upon the ruby D, the moment it unlocks the flange G, of the screw, F, will roll itself down the inclined plane E, which is made fast upon the cylinder C, and, consequently, impel the balance forward, and lock again upon the ruby D, the lever I, having made one revolution in the same space of time that the screw rolled down the inclined plane. It must be observed, that three diameters, or nearly so, is the space of contact upon the cylinder, which is to be passed over by the screw. The number of degrees of impulse will depend upon the quantity of space which the inclined plane extends over on the cylinder: thus, any number of degrees of vibration may be obtained by the number of degrees of impulse; and this again will depend upon the diameter of the revolving lever F, G. A screw with one turn in the eighth of an inch, may be made to perform as well as a screw with one turn in one inch; if the proper angles of the impeller and the impelled be nicely associated, any alteration in the length of the screw will directly alter the inclination of the plane: fig. 3, showing the action of the double screw; A, balance by which the escapement axis is caused to make a complete revolution by two impulses; B, axis; C, the cylinder; D, ruby; E, inclined plane; F, M, G, a double screw; I, L, the double locking piece; H, the hollow pinion, made fast as in figs. 1, and 2; K, L, bird's-eye

view of the locking I, L. The difference between the single and the double screw is, that the latter can be made half as flat again as the single one, and yet retain the same angle, the double screw making two impulses in its revolution, and the single screw only one; thus it will be seen that the same principle is maintained in fig. 3, as exists in figs. 1, and 2, the locking and screw differing only in numbers; fig. 4, bird's-eye view of the cylinder C; fig. 5, the application of the principle to the propelling of a pendulum as in a clock. The screw is made to extend across the frames, in order to exhibit the principle correctly: A, verge; B, C, inclined plane, which is impelled by the screw and made fast upon the verge; E, the screw lever for locking; L, hollow pinion made fast on the screw D; F, G, wheel and pinion of the train, supposed to be propelled by the ordinary weight or spring; M, the locking end of the verge that receives the lever E: every beat this lever is made fast to the screw D, one end of which comes through the plate K, the crutch which propels the pendulum H, fig. 6, shows a method of making watches extremely flat on the same principle: A, an expanding lever, whose beginning of impulse is at the figure *o*, and which continues to expand and propel the balance, as shown by numbers 1, 2, 3, 4, 5, 6, 7, 8, 9, and concludes at fig. 10, leaves the roller revolving in the direction of the arrow G; C, is a lever projecting from the axis of the balance D, having been made fast so as to be moved right or left; B, a small roller fixed so as to move freely in the lever C, and to revolve upon its own axis. Suppose a power to be applied to the axis of the expanding lever A, it will cause it to move and begin the contact at the figure *o* upon the roller B, fixed in the lever C, and consequently push the balance forward to the right, until the point 10 of A, as seen by the dotted circle F, will have arrived at its quiescent position, as at present

drawn, the locking lever falling upon the ruby cylinder as described in plan the first, figs. 1, 2, and 3. The balance having received its impulse will vibrate to the right, return to the left, move again to the right, unlock and receive the power from the expanding lever A, and so continue its vibrations; fig. 7, shows a side view of fig. 6; A, an expanding lever made fast upon the axis H; F, F, two views of the lockings fixed fast upon the pinion G; D, the balance; K, balance axis; C, the impelled lever; B, the roller; I, the pinion before the locking piece is made fast upon it. The revolving lever A, is pressed tight on at H, so as to be moved to the right or left. In arranging the escapement, suppose the fifth wheel of the train to impel the pinion G, the same effect will be accomplished as described in fig. 6: fig. 8, shows a modification of that shown at fig. 6, by which two impulses are obtained for one revolution of the escapement axis; *a*, is the balance wheel; *b*, the escapement axis: fig. 10, shows a clock on the same principle; A, the expanding lever; F, the locking lever; E, the cylinder that receives the locking lever; B, the friction roller; C, the lever which is connected with the crutch that impels the pendulum, as in fig. 5. Thus, it will be seen that any length of lever can be obtained for a clock, and the friction in proportion reduced. A double lever may be made upon the same principle, keeping in mind the proper curve which must gradually expand from the centre and the locking, which must be double; fig. 11, shows the method of locking the clocks for the royal pendulum, or longer ones requiring less vibration; A, the lever made fast upon the same axis, as the impelled lever is fixed upon having a little notch cut in its centre, as at C, in order to let the locking lever B, pass from a state of rest: fig. 12, is another arrangement for propelling pendulums and balances upon the same theory, making one or two revolu-

tions every time the propelling lever strikes the balance or pendulum; A, the verge; B, the last pinion of the train, one end of which comes through the back plate, as at C; D, the pin that propels the lever E; F, the crutch as in common clocks; the letters E, D, and C, a front view of the same parts: fig. 13, shows the application of this method to a watch; B, the circle made fast upon the axis of the balance A; H, the ruby pin propelled by the long end of the lever; F, E, the other end of the lever where the pallets are formed, as in fig. 12, only differing in their distance from the centre of motion; D, the pin made fast in the small wheel C, the power applied giving motion to the wheel C, the method for propelling the balance is the same as the one now in use, called the detached lever escapement; and I would remark, that the inclination of the screw may be to the right or left, only the inclined plane in the cylinder must be arranged as I have described in the drawing.

The train must be greater in number than other chronometers, watches, clocks, &c., in consequence of the quicker motion in the train between the fourth wheel and the revolving lever: suppose the fourth wheel to be 90, the fifth wheel pinion six, the wheel 60 pinion six, which is fixed upon the revolving lever 15 × 20, three hundred beats per minute, supposing the fourth wheel marking seconds, when the revolving lever is double, the train will be lower in number.

The locking I do not claim as mine; it is the same as the duplex watch, being the one I have placed in the drawings, any lockings may be used as the maker may think proper.

Having thus described my invention, I would remark, that the great object of my invention has been to attain a complete revolution of the escapement axis for each im-

pulse, at the same time as the peculiar properties of my invention offer advantages over the previously used escapements, when extended to two impulses for one revolution of the escapement axis. I have shown the invention as arranged for accomplishing with two impulses for one revolution; and it will be evident that the invention might be still further extended to three impulses for each revolution, and yet be superior to the ordinary escapements now used. But I consider that any departure beyond the two impulses for each revolution of the escapement axis is to the prejudice of my invention; the main object and advantage of which is the dispensing with the escapement wheel of many teenth heretofore employed, and applying a suitable instrument to the escapement axis, in order to obtain a complete revolution of such axis for each impulse; by which I not only decrease the possibility of the workman's errors of workmanship, but also have the further advantage over the making of the escapements now employed, inasmuch as a workman of much less ability may make escapements according to my invention, and produce a result superior for correctness over the escapements now employed, which require the skill of first-rate workmen.—[*Inrolled in the Inrolment Office, May,* 1839.]

To Elias Robison Handcock, *of the city of Dublin, late of his Majesty's* 9*th Regiment of Infantry, and of Rathmoyl-house, in the Queen's County, Esq., for improvements in castors for furniture and other purposes.* —[Sealed 17th October, 1838.]

These improvements in castors for furniture and other purposes, consists in forming such castors on the principle

of a ball and socket, by placing a spherical roller within a box, frame, socket, or recess, in which it is enabled to turn in any direction and become a universal roller, having its bearings above, against the peripheries of several anti-friction rollers mounted on axles within the box, recess, or socket.

The objects of these improvements are, first, to reduce the amount of friction in castors; and secondly, to obtain a perpendicular bearing upon the roller immediately over the centre of the socket, instead of the ordinary mode of mounting the roller of the castor upon a horizontal axle in an arm extending from a vertical spindle; which improved construction affords greater strength in the castor, and avoids the friction and strain to which the ordinary construction of castors are subject.

Fig. 1, Plate XVIII., represents an external view of one form of the improved castor in its complete state; fig. 2, is a vertical section of the same: *a*, is the spherical roller or ball; *b*, *b*, the socket or box; *c*, a plate extending across the upper part of the box, to which are affixed brackets *d*, *d*, that carry the axles of the anti-friction rollers *e*, *e*, against the periphery of which the upper part of the surface of the ball bears; and the ball is prevented from falling out of the socket by a collar *f*, *f*, screwed into the socket below. The plate *c*, with the brackets *d*, and rollers *e*, is shown in a detached view at fig. 3.

Fig. 4, represents another form of castor, the internal construction of which, however, is the same, or nearly so, as that above described. Fig. 5, is a vertical section of fig. 4, all the operating parts in which are marked with similar letters of reference to fig. 2, and therefore their description does not need to be repeated. In the latter instance, however, the castor is to be fixed to the under

part of the piece of furniture by a vertical screw pin, whereas in the former it is affixed by the leg of the piece of furniture being inserted into the upper part of the socket.

In the construction of castor first above described, four anti-friction rollers *e, e, e, e,* are employed; in the second, six; but I do not intend to confine myself to any precise number of anti-friction rollers, nor to their form, as they may be either cylindrical or bowled.

Fig. 6, is a horizontal view of the plate *c,* and anti-friction rollers *e, e, e,* in which five rollers are adapted; and fig. 7, is a similar view of the plate and rollers, in which six rollers are adapted; and instead of mounting them upon separate axles in brackets, a circular wire *g, g, g,* passes through all the rollers, which is confined in its place by a circular groove in a bead or circular rib *h, h, h.*

Fig. 8, which is a representation of the plate *c,* and rollers *e, e, e,* of fig. 5, shows a similar adaptation of six anti-friction rollers, in this instance made bowl-shaped.

Fig. 9, is another shaped castor, the internal construction of which is the same as shown at fig. 2. Fig. 10, represents a castor, the socket of which is intended to be inserted into the under part of the piece of furniture; it is particularly applicable for trucks and gun-carriages on ship-board. The flanged plate *f, f,* forms the collar that confines the spherical roller in the socket, and by means of which the castor may be screwed on to the furniture, as shown by the representation of the under part at fig. 11.—[*Inrolled in the Rolls Chapel Office, April,* 1839.]

Specification drawn by Messrs. Newton and Berry.

To William Gossage, *of Stoke Prior, in the county of Worcester, chemist, and* Edward White Benson, *of Whichbold, in the same county, chemist, for their invention of an improvement or improvements in the process of making or manufacturing ceruse or white lead.*—[Sealed 29th March, 1836.]

In manufacturing ceruse or white lead by our improved process, we make use of oxides of lead, acetic acid, or acetate of lead, and carbonic acid gas. Oxides of lead are materials well known in commerce; any oxide of lead, however prepared, which is capable of uniting with carbonic acid, and thereby producing white lead, may be employed in our process; and of these oxides, which are usually met with in commerce, we find those called litharge and massicot to be particularly suitable, but that called red lead does not answer the purpose. The acetic acid we employ is that which is sufficiently free from colouring matter, as the presence of this would be liable to give colour to our white lead, and thereby injure its quality. We make use of acetic acid either in a free acid state, or in a state of combination with oxide of lead. The former, as it is well known to chemists, may be obtained very nearly colourless by distilling vinegar of commerce, or it may be procured by the decomposition of acetate of lime, or other combination of acetic acid with alkaline bases or metallic oxides.

The processes by which this decomposition is effected are well known to chemists, and the acetic acid thus prepared is an article of commerce. When acetate of lead is made use of, it may be procured in the state of sugar of lead, or of solution of acetate of lead, commonly called Goulard's extract of lead, both of which are articles of

commerce. Carbonic acid gas may be obtained by various processes which have been heretofore in use; but the one we prefer, because of its economy, is that of burning charcoal, coke, or coal, with atmospheric air.

In order to obtain carbonic acid gas by this process, suitable for the purpose of our invention, it is desirable to make use of the material as free as it is possible to obtain it from all bituminous or volatile matter, and consisting almost wholly of pure carbon. This should be submitted to combustion in a common stove or furnace, and the gases produced, consisting of carbonic acid gas mixed with the residual atmospheric air, may be conducted through a series of metallic tubes, which should be so arranged either by being placed in water or exposed to currents of cold air, that the gases shall be cooled down to a moderate temperature during their passage through these tubes; and for the purpose of arresting any portions of unconsumed carbon or other matter which might give a colour to the white lead, we cause these gases to pass through a filter or series of filters, which are charged either with coarse sand or other metallic lead, granulated by pouring this, when melted, into water. These filtering materials are placed in a vessel through which the gases are caused to percolate; and we cause a very small stream of water to pass gradually through these vessels, so as to keep the filtering materials continually moist, which we find assists greatly in ensuring a more perfect purification of the gases: and if we apprehend the presence of sulphur with the carbon we are consuming, we add a little alkali to the water used for moistening the filtering materials. Notwithstanding these precautions, we consider it necessary to be careful in selecting the material for producing carbonic acid gas. The carbonic acid gas which is present in the atmosphere can be employed for carbonating the oxide of lead by our

process; but as the proportion of carbonic acid usually contained in the atmosphere is small, this causes the conversion of the oxide of lead into carbonate to proceed slowly, we, therefore, prefer making use of carbonic acid gas prepared artificially.

Having thus described the materials required for our process, we will now give a description of the manner in which we consider it best to make use of them. If the oxide of lead is in considerable masses, it should be reduced to the state of a coarse powder; but litharge seldom requires this operation, as it will answer the purpose in the state it is usually met with. We mix the oxide of lead with the requisite quantity of acetic acid or of acetate of lead, and with as much water as will bring the mixture to such a state of dampness as will make it slightly coherent, and then spread it on trays or shelves covered with sheet lead, causing the mixture to form a thin loose bed or stratum on the tray or shelf. We place a number of these trays or shelves one over another in a case or apartment, and we cause a current of carbonic acid gas, either pure, or mixed with such other gases as are not injurious to our process, to come in contact with the mixture. The carbonic acid gas becomes absorbed, and combines with the oxide of lead so as to form carbonate of lead, which is ceruse or white lead; and as this process of absorption advances, we find it is accelerated by raking or stirring the mixture so as to expose new surfaces to the action of the carbonic acid gas; and if this gas does not contain sufficient watery vapour combined with it, we add as much water to the mixture as will keep it in a certain state of dampness; the most favourable degree of this is soon ascertained by a few trials of the operation. We find, as the process advances, the oxide of lead becomes changed from a coloured to a white substance; and when the mixture appears to be completely free from

all coloured particles, we judge that the operation is completed, and the whole of the oxide is converted into white lead.

We find the duration of this process depends on the proportion of acetic acid or acetate of lead employed, and on the supply of carbonic acid gas; also on the care which is taken to stir or rake up the mixture, and supply it with the requisite quantity of water, with the proportions of oxide of lead and acetic acid, or acetate of lead, we generally make use of, and which proportions are hereinafter specified, and with a good supply of carbonic acid gas and proper attention to the operation, we can finish this part of the process in from three to six days.

We find it to be an economical method of conducting this process, to commence by mixing the oxide of lead with a full proportion of acetic acid or acetate of lead, as hereinafter indicated; and when the oxide is wholly or very nearly converted into carbonate, to add a further quantity of oxide to the same mixture, without a further addition of acetic acid or of acetate of lead; and the mixture being again exposed to the action of the carbonic acid gas, the oxide it contains speedily becomes converted into carbonate; and we then add a further portion of oxide, and proceed in the same manner as before, taking care always to keep the mixture in the requisite state of dampness by the addition of water. We repeat these successive additions of oxide without further additions of acetic acid or of acetate of lead, till the proportion of acid or of acetate mixed with the oxide of lead is reduced to one-fourth, or even less, of the proportion mixed in the first instance.

After this carbonating process is completed, as before described, we remove the mixture to a drying stove, where it is exposed in the usual manner to become dry, and we then grind the dry substance with water in the same

manner as is practised by those who manufacture white lead by the well known process generally adopted: and we dry the ground white lead in a stove, and we thus obtain it in a state suitable to be made into paint, or to be used for the other purposes to which white lead is applied.

The mixture, when removed from the trays or shelves, might be reduced to a fine powder by washing or by levigating with water, without previously drying it; but we consider the quality of the white lead is improved by drying the mixture before it is levigated or ground with water. When we use acetic acid for mixing with the oxide of lead, we generally take, for 100 pounds of oxide, as much liquid acetic acid as is contained in 20 pints of such vinegar as is called "proof" vinegar by the Excise, and is known in commerce by the appellation of No. 24; and when we employ acetate of lead, either in the solid state or in solution, we take as much of either of these as will contain the above proportion of acetic acid.

We have given the proportions herein indicated as those which we consider the most economical and the best adapted for carrying into effect our invention; but we do not confine ourselves to these particular proportions of acetic acid, or of acetate of lead and oxide of lead, but we consider ourselves at liberty to make use of those materials in any proportions within the limits hereinafter specified.

We do not claim as our invention, any particular form of apparatus for carrying our process into effect, or any peculiar mode of generating carbonic acid gas, but we consider the forms of apparatus and the method of generating carbonic acid gas we have described as the best adapted for our purpose of any we are acquainted with. And whereas acetic acid, acetate of lead, oxide of lead, water, and carbonic acid gas, have been before employed in the manufacture of white lead, these materials being used in

such proportions that the acetic acid was capable of dissolving the whole or the greater part of the oxide of lead, if mixed with sufficient water for such purpose of solution. And whereas these materials have been used in mixture containing such proportion of water as would render the mixture of acetic acid or acetate of lead with oxide of lead fluid, or would reduce it to such a state of fluidity that the mixture would flow as a liquid from one vessel to another; therefore, we do not claim any right or privilege as to the use of these materials in either of the proportions just stated, but we confine our claim to the employment of these materials in the proportions hereinafter specified; that is to say, we claim, as our invention, the formation of white lead, by exposing to the action of carbonic acid gas, either pure or mixed with such other gases as may not be injurious, and obtained by the means described, or by other means, or from the atmosphere, a mixture of oxide of lead with acetic acid or acetate of lead and water, in such proportion that the acetic acid would not be capable of dissolving more than one-fourth part of the oxide of lead when assisted by sufficient water for such purpose of solution.

And we further claim as our invention, the formation of white lead by the use of a mixture to be exposed to the action of carbonic acid gas; which mixture shall consist of oxide of lead and acetic acid or acetate of lead, within the proportions we have just described, with such a proportion of water added, as will not be sufficient to reduce the mixture to a state of fluidity which would allow of its flowing as a liquid from one vessel to another.—[*Inrolled in the Petty Bag Office, September,* 1836.]

To John Christophers, *of New Broad-street, in the city of London, merchant, for his invention of an improvement or improvements in anchors.*—[Sealed 27th June, 1833.]

This invention consists in making the opening in the shaft of the anchor, through which the wooden stock passes, twice as long as it is wide. This is the whole of the invention as specified; and where the advantage to be derived from this is, we must leave those of our readers who are acquainted with shipping to guess.—[*Inrolled in the Inrolment Office, December,* 1833.]

To John Dovor, *of Thames-street, merchant, and* William Jones, *of Bartholomew-close, chemist, both in the city of London, for their invention of improvements in filtering fluids.*—[Sealed 28th November, 1837.]

This invention relates to a mode of clarifying such fluids as require such a process so as to render them fit for use, and consists in causing such fluids to pass through the skins of animals by the aid of pressure, by which means a high degree of purification takes place.

The skins employed for this purpose are sheep skins, in preference to others, although the skins of other animals will answer the purpose. These skins should not be tanned, but are to have the wool cut off, and are to be treated in the same manner as if they were going to be tanned, as will be readily understood by tanners. The skins, when prepared, must be laid on some supporting surface, such as hair cloth, when placed in the filter, as the strain or pressure to which they would be subjected would otherwise quickly injure the texture of the skins.

The Patentee says, in conclusion, that the fluids to be clarified or filtered may be forced upwards through the skins, if thought preferable: and they claim as their invention, "the application of the skins of animals as a filtering medium to filtering apparatus or machines for clarifying or purifying such fluids as require that process."—[*Inrolled in the Inrolment Office, May*, 1838.]

To JAMES CALDWELL, *of the New Crane, Shadwell, in the county of Middlesex, coal-merchant, for certain improvements in cranes, vessels, and apparatus for delivering coals from shipping to wharfs, warehouses, waggons, or carts, without the employment of lighters, as usual; and the whole or part of which said improvements are also applicable to other purposes.*—[Sealed 12th June, 1833.]

THE invention specified consists in a certain arrangement of mechanism, by means of which two men will be enabled to raise about nine hundred weight of coals at one time from the hold of a vessel, and deposit the same in a cart: parts of such mechanism, together with the weight of the men acting as a counter-balance, and facilitating the delivery of the coals or other burden.

The peculiar arrangement of parts for effecting this will be understood from the following description:—An upright standard or pillar, properly and firmly secured both at top and bottom, is affixed to the deck of a ship, or in any other convenient situation, and upon one side of this pillar a toothed rack is formed. A moveable platform is connected to the pillar in any convenient manner, and slides up and down in a groove formed on it. A pinion, which is mounted in some part of the moveable platform, gears into the

toothed rack formed on the pillar; and to the axle of this pinion a winch handle and brake wheel is attached. A rope, connected to the moveable platform, is passed over a pulley mounted at the top of the pillar, the reverse end of the rope being fastened to the coal box below. Two ratchet racks, having clicks connected to the platform taking into them, are placed one on each side of the toothed rack before mentioned, in order to prevent the platform from running down, and to retain it in any elevation that may be required.

When the machine is required for use, the men on the platform turn the winches in order to raise themselves to such an elevation as will lower the coal box to the required depth in the hold; and when the box is full they turn the handles the reverse way and begin to descend, and, consequently, raise the coal box.

It will be readily understood that if the weight of coals to be raised is nine hundred weight, and if the moveable platform with its appurtenances, together with the men, weigh five hundred weight, then the power to be employed need not exceed that required to raise four hundred weight in the ordinary manner, as the weight of the platform and the men will materially assist the ascent of the coal box.

The box for containing the coals is so contrived that the bottom may be moved or tilted up, so that the coals may drop through; and, according to the drawings, it seems to be divided into four compartments, probably for the convenience of filling sacks. The first part of the invention may be applied to raising other weights.—[*Inrolled in the Inrolment Office, December,* 1833.]

To John Holmes, *of St. John's-terrace, Worcester, engineer, for his invention of improvements in forming moulds for casting in metal studs, buttons, nails, tacks, and a variety of other articles.*—[Sealed 13th November, 1838.]

These improvements, in forming moulds for casting in metal, studs, buttons, nails, tacks, and a variety of other articles, consist in the employment of a pair of parallel plates fitted to each mould, and peculiarly formed with elevations and depressions in or upon their faces, suited to the desired figures of the articles to be cast. The inner surfaces of these plates are made perfectly level, so as to come in close contact with each other between the two frames, forming the box in which the sand is held and moulded for casting. The outer surfaces of these plates have the elevations and depressions so formed as to give the upper and under figures of the heads of the nails, studs, buttons, or articles to be cast; and the shanks, of whatever form required, are produced by suitable spikes or shafts extending from the inner surface of one of the plates, and passes through perforations in the other plate, at parts exactly corresponding to the situations of the centres of the heads or bosses of the nail, stud, or other article.

The mould is made by pressing sand, as in the ordinary operations of moulding; but in this instance the two faces of the mould are made upon the outer faces of those two plates confined in the middle of the mould box between the moulding frames; and when such mould has been so produced, the two parts of the moulding frame are taken asunder, with the plates separated at their inner surfaces. The plates are then respectively withdrawn from the faces of the moulds, and the frames holding the moulded sand

being put together and made fast, the mould is ready for casting.

The forms of the elevations and depressions to be made in or upon the plate, must depend upon the desired shape of the head of the article to be cast; so must also the forms of the spikes or shafts depend upon the required shape of the shank. In order, however, to give such information respecting my invention as shall render the manner of carrying it into effect perfectly evident, I have hereunto appended drawings of portions of a pair of plates and moulds suited for moulding nails for coffins, or for ornamenting furniture; but I wish it to be understood, that though I am about to describe the best manner with which I am acquainted of producing or forming such plates, yet I do not intend to confine myself to that precise manner, but intend to avail myself of any other mode by which plates may be made to answer the purpose above described, when applied to moulds in the way above pointed out.

Fig. 1, Plate XVI., represents a portion of the outer face of a plate A, and fig. 2, a portion of the outer face of the corresponding plate B, suited for moulding coffin nails: fig. 3, is a section taken vertically through the plate, fig. 1, and fig. 4, is a similar section taken through the plate, fig. 2. These plates are produced by rolling metal, or by any other suitable means by which they may be made flat and parallel (their thickness is of no consequence, provided they are sufficiently strong and stiff to retain their flat surfaces).

One of these plates is to be accurately set out on its face in divisions, according to the number and size of the intended nails (or a gauge plate may be applied upon its surface, to mark the points or centres). This plate is then drilled through at the centres, and a series of large holes formed, of the sizes of the heads of the intended nails.

This plate may be supposed to be represented by B, figs. 2, and 4. This and the former plate A, shown at figs. 1, and 3, are then brought face to face and fastened together; and by means of a small drill, having a cylindrical plug fitting the holes of the plate B, fig. 2, the plate A, fig. 1, is drilled, and small holes thereby produced through that plate, which will be perfectly concentric with the larger holes previously made in the former plate.

The two plates A, and B, are then taken apart, and with a suitable drill a concentric recess *a, a, a,* is made round each hole in the outer face of the plate A, figs. 1, and 3; which recesses are to produce in the mould the forms of the under parts of the heads of the intended nails. I then form plugs from stout wire, cut off into short pieces suited to fit the large holes *b, b, b,* made in the plate B, figs. 2, and 4. In the centre of each of these plugs I then drill a hole, and insert into it a steel spike, shaft, or pin *c*; I then place the plugs singly in a lathe, and grind their outer ends to a hemispherical or other required shape, corresponding with the desired form of the outer part of the head of the intended nail. These plugs, with their spikes, I then fix firmly in the holes of the plate B, fig. 2, as shown in the section, fig. 4; and on the outer surface of the plate B, fig. 2, I affix ribs, as shown at *d, d,* which are to form in the mould the gutters for conducting the melted metal; these ribs having small elevations to produce gates for the metal to run from the gutters into the moulded recesses for casting the nails.

The two plates A, and B, being thus prepared, are put together face to face, as at fig. 5, which represents the mould box formed by the frames C, and D, with the plates A, and B, between them. The mould box is then filled with sand, as in the ordinary mode of moulding for castings, and rammed tight against each of the outer surfaces

of the plates. When this has been done completely in a workman-like manner, the two parts of the mould are separated at the middle between the inner surfaces of the plates A, and B, by carefully raising the upper frame C, with the plate A, perpendicularly, so that the spikes *c*, may not disturb the sand in the mould above. The plates A, and B, are then lifted off the faces of the two moulds, and the frames being again put together without the plates, the mould will be ready for pouring, having the recesses formed in it for the nails to be cast in, as shown in the vertical section of the mould at fig. 6.

The nails, when cast, will be taken out of the sand in sprays, and are to be broken off from the gates in the usual way. They may then be annealed and afterwards tinned, and their heads may be lacquered or japanned as shall be required, or they may be coated by discs of brass or other metal by the machines and means already known; which coating of the heads of nails or tacks forms no part of my present invention.

If I desire to cast nails with any other shaped heads or shanks different from those above described, it would be necessary to change the forms of the recesses *a*, in the plate A, and also the ends of the plugs *b*, in the plate B, and of the spikes *c*, inserted into the plugs, which will be readily understood. And if I wish to cast studs for rivetting boilers, or blank shafts for making screws, instead of the thin spikes *c*, I should insert in the plate B, stout projecting plugs, according to the required substance of the stem or shaft of the rivet, stud, or screw blank, or button, or any other article of that kind, and form corresponding holes in the plate A.

And I would, lastly, observe, that I do not intend to confine myself to casting in any one particular metal, as the same mode of forming moulds for casting studs, buttons,

nails, tacks, and other articles, by means of plates with elevations and depressions on or in their surfaces, will apply in a great variety of situations, whatever may be the kind of metal employed.—[*Inrolled in the Rolls Chapel Office, May,* 1839.]

Specification drawn by Messrs. Newton and Berry.

To CHARLES BUTTON, *of Holborn-bars, chemist, and* HARRISON GRAY DYAR, *of Mortimer-street, Cavendish-square, gentleman, both in the county of Middlesex, for their invention of improvements in the manufacture of white lead.*—[Sealed 23d December, 1837.]

THIS invention is divided into three parts, consisting, firstly, of a method of purifying the gases and vapours arising from anthracite, stone or mineral coal, or from coke, so that the gases arising from such kind of fuel may be used in the manufacture of white lead; secondly, in the use of basic nitrates of lead for making carbonate of lead; and lastly, in manufacturing white lead from litharge, massicott, or protoxide of lead, by boiling nitrate of lead with either of these substances, and submitting such mixture, while in a heated state, to the action of carbonic acid gas.

Fig. 1, Plate XVII., is a longitudinal section of the apparatus used in making white lead from litharge, massicott, or protoxide of lead: *a*, is a pair of common forge bellows, furnished with a weight *b*, and safety valve *c*. The nozle pipe of the bellows is connected to the furnace *d*, which is a cast iron vessel, having a cap or cover *e*, made air-tight with fire clay: *f*, is a pipe leading from the furnace, and through which the flame passes into a vessel *g*, called the flame chamber, where the gases or vapours from the furnace are burnt; *h*, is a pipe leading from the nozle pipe

of the bellows to the flame chamber, to supply the latter with atmospheric air. This pipe will be seen best at fig. 2, which is a sectional plan view of the apparatus taken at the line at *a, b,* in fig. 1. The gases from the flame chamber pass through the pipe *i,* into a large closed cylindrical iron vessel *j,* called the washing vessel. This vessel is furnished with a washing apparatus, consisting of a flat circular plate of iron *k,* having a spiral coil of flat sheet iron, open at bottom, attached to its under side, see fig. 2. By this arrangement the air enters the vessel at the outermost part of the coil, and circulates round the coil until it arrives at the centre, at which place an opening is made through the plate, so that the vapours and gases may pass into the upper part of the vessel through a diaphragm *l,* of fine wire gauze, supported by perforated copper plates. A stirrer or agitator *m,* is attached to the lower end of an upright shaft *n,* which passes through stuffing boxes *o, o,* in the upper part of the vessel, and may be put in motion by hand, or in any other convenient manner. When the vapours and gases arise to the upper part of the vessel they make their escape through the pipe *p,* into two cylindrical copper vessels *q, r,* which are surrounded by copper jackets or casings *s, s, s, s,* thus forming a steam-tight vacant chamber. Steam is admitted into this vacant space through the pipe *t,* and the condensed water is conveyed away through the branch pipe *u.* The copper vessel *q,* may be called the white lead vessel, and the vessel *r,* the litharge, massicott, or protoxide of lead vessel.

It will be seen, by reference to fig. 2, that the vessel *q,* has a copper tube *v,* coiled spirally round the bottom. This spiral tube is connected at one end to the pipe *p,* the other end being closed; and it is pierced with a great number of small holes, so that the vapours and gases which pass down the pipe *p,* and through the coiled tube *v,* issues

therefrom in a great number of small streams or bubbles. The litharge vessel is furnished with a shaft, having arms attached to it, and acts as a stirrer or agitator. Two pumps *y*, and *z*, placed above the vessels *q*, and *r*, draw the contents therefrom by means of suction pipes, and discharge the same into filtering bags *w*, *w*, made of coarse linen sheeting, stretched on square wooden frames.

The mode of putting this apparatus to work is as follows:—The cap or cover *e*, being removed from the furnace *d*, a small quantity of ignited fuel is to be thrown in, and the bellows set at work. The furnace is then filled up with anthracite, or stone coal or coke, and when the fire becomes well lighted, the cap or cover *e*, must be put on and fastened down tight. The coal in the furnace, as high up as the pipe *f*, is allowed to get completely ignited before the gas arising therefrom is used, because then the volatile particles liberated from the coal will, in their passage through the red hot fuel to the flame chamber, be partially decomposed, and be at a very high degree of temperature. When the vapours arising from the combustion enter the flame chamber, they will be mixed with a portion of atmospheric air, which is conducted to the chamber by the pipe *h*. This supply of atmospheric air is so proportioned to the quantity of vapour which passes through the chamber, that any sulphuretted hydrogen that may be there will be converted into sulphurous acid, and the vapour of water; and any carbonic oxide into carbonic acid.

A mixture of equal parts of carbonate of soda, whiting, carbonate of lead, or other materials well known to chemists, is put into the washing vessel previous to putting in the wire gauze diaphragm, for the purpose of absorbing sulphuretted hydrogen and sulphurous acid; and through the funnel *x*, water is poured into the vessel until it rises above the iron plate *k*, the materials being then mixed in

the proportion of 10 to 100 of water. The vessels *q*, *r*, are then nearly filled with distilled water, and about fifty pounds of litharge, massicott, or protoxide of lead, and twenty pounds of nitrate of lead, is put into the vessel *r*. Steam is then allowed to pass into the space between the vessels and the copper jackets, and the contents of the vessels made to boil. The stirrer in the litharge vessel is also set in motion by means of a strap passed round a pulley mounted on the shaft. The pumps *y*, and *z*, upon being put in action, will draw the contents from each of the vessels, and discharge the same into the filters *w*, *w*, as before mentioned.

It will be understood, upon inspecting the drawing, that upon the pump *z*, drawing the contents from the vessel *q*, and discharging the same into the filter, it will necessarily suck up some white lead, which will be retained in the filter, the liquor dropping through into the vessel *r*, below: the same will, of course, happen with the other pump, and the apparatus being in this condition, atmospheric air will pass from the bellows into the furnace and flame chamber, and through the washing vessel, from whence it passes, in the form of carbonic acid, down the pipe *p*, and finally escapes through the holes in the coiled pipe *v*, which is placed at the bottom of the vessel *q*. The apparatus thus arranged will make white lead, which will be found in one of the filtering bags, whilst the other filter contains a small quantity of impurities. The filter containing the lead may be removed as often as it becomes filled, and the other filter changed as often as requisite, in order to be cleared from the litharge and impurities.

The Patentees now proceed to describe the method they adopt of giving this white lead a body, as required for commercial purposes. The white lead, as taken from the filter, is placed in another filter and well washed with pure

water, in order to get rid of any nitrate of lead that may remain mixed with the white lead; and this water may be added from time to time to the contents of the litharge vessel, so that not any of the solution of nitrate of lead may be lost. The washed white lead is now to be removed from the filter to a mashing tub, in which an upright shaft, furnished with horizontal arms, is mounted: these arms are slightly inclined so as to cut through the white lead, and have a tendency to press it towards the bottom, which is perforated and furnished with a straining cloth, thus continually mashing the white lead and condensing it. The mashing process must be continued until water ceases to run from the white lead, after which it is conducted through a pipe or channel into the hopper of a horizontal mill, where it is ground, and from thence to a receiver; and if required for immediate use, it may be subjected to pressure, in order to get rid of any water that may still remain in it.

The Patentees state, in conclusion, that they do not claim the apparatus for generating carbonic acid gas, nor the means described of introducing the same in the solution when generated; nor do they claim any particular apparatus to obtain either the combustion or purification of the vapours or gases arising from the fuel in the furnace; but they claim, as their invention, firstly, the acting upon the vapours and gases arising from the fuel, whereby the impurities in the said vapours, which might otherwise deteriorate the quality and injure the colour, are destroyed, by which means they are enabled to use that cheap kind of fuel called anthracite or stone coal, or coke, instead of charcoal, and also to use the carbonic acid arising therefrom, in the manufacture of white lead; secondly, in manufacturing white lead from compounds of nitric acid with oxide of lead, in which the quantity of oxide of lead bears a greater ratio to the nitric acid combined therewith, than

the oxide of lead bears to the nitric acid in the ordinary nitrate of lead of commerce; and thirdly, in making white lead by uniting and acting upon, or mixing litharge, massicott, or protoxide of lead with nitrate of lead, and submitting the same, when so mixed together, to the action of carbonic acid, in order to produce carbonate of lead, and in such a manner that the same nitrate of lead may be used over and over again many times, with fresh portions of litharge, massicott, or protoxide of lead.—[*Inrolled in the Inrolment Office, June,* 1838.]

To HARRISON GRAY DYAR, *of Mortimer-street, Cavendish-square, in the county of Middlesex, gentleman, for an invention of improvements in the manufacture of zinc.* —[Sealed 20th November, 1838.]

ACCORDING to the ordinary modes now pursued for manufacturing metallic zinc, the oxide of zinc, mixed with coal, is submitted to a process of distillation, by enclosing oxide of zinc, prepared for reduction, in retorts, crucible pots, or such like vessels, and by heat applied to the external surfaces of such retorts or vessels, the metal is reduced from the oxide, and is driven off and condensed in suitable receivers: this is necessary to protect the zinc from the action of the air.

Now, the object of my invention is, to accomplish the same end without enclosing the zinc in such vessels, by depriving the air of those properties or matters which would injuriously act on it, and the ore or oxide of zinc, prepared for reduction, is exposed to the direct action of the fire. The burning fuel in the furnace being so placed or arranged in relation to the ore placed in the furnace, that the air, after passing through the fuel, shall, before it comes

in contact with the ore, be deprived of those properties or matters which would otherwise be prejudicial to the process of obtaining metallic zinc; and in order to give the best information in my power, I will describe the means and apparatus resorted to by me for carrying out my invention, and which I believe to be the best arrangement for the purpose.

Fig. 14, Plate XVII., represents the section of a furnace suitably arranged for carrying out the invention; and I would, in the first place, remark, that in arranging the furnace or apparatus properly for performing the invention, that its arrangement should be such, whatever may be its form, as to possess the capabilities hereafter explained, whereby metallic zinc may be advantageously manufactured from the ore or oxide of zinc prepared for the purpose, by an exposure to, or by means of what may be called a naked fire, in contradistinction to the zinc, being protected from the fire by being placed in retorts, crucibles, or such like vessels, as heretofore practised.

The general nature of the means whereby this modification of the process of smelting is rendered practicable with zinc, consists in so arranging the furnace or burning fuel in relation to the ore of zinc or unreduced zinc, and the zinc after reduction, as that when the hot or burnt air, or gaseous products of the combustion, shall come in contact with the ore of zinc, prepared and placed in the furnace for reduction, there shall be in this hot or burnt air little or no free oxygen, carbonic acid, or other gases or vapours capable of oxydizing metallic zinc. By this method, the necessity of enclosing the unreduced zinc (in whatever substance or combination it may exist) in retorts, crucibles, or other such vessels, is avoided; and instead thereof, the hot or burnt air is deprived of those matters which make the enclosing necessary, it should be understood that the burnt

air or products of combustion should only contain carbonic oxide, nitrogen (or azote), hydrogen, carburetted hydrogen, or such other gases or vapours as are incapable of having any prejudicial action upon metallic zinc, at the temperature which may be used in reducing zinc; and that after the hot or burnt air has acted on the prepared zinc ore, it shall be so far cooled as that none of the zinc in the state of vapour, or otherwise, shall pass into the external air, so as to be burnt, oxydized, or otherwise lost: A, is the fire-chamber, filled with coke; B, the chamber where the prepared ore is placed to be reduced; C, a recipient for the condensed zinc, reduced and distilled from the ore; D, a pipe from a blowing machine; E, a closed place, that can be opened to clear out the furnace; F, F, two covers of cast iron for getting at the chamber A, and B; G, G, are cast iron pieces, with a groove, either circular, or of such a shape as to receive the projecting sides or edges of the covers, and being filled with sand to make a closed joint, as shown at H; I, is the upper part of the fire-chamber; K, an iron pipe through which the burnt air and vapourized zinc passes, and are cooled, to condense the metal which falls into C; L, a pipe opposite to K, of sufficient length, before opening into the air, to condense all the vapour of zinc, and so far cool the burnt air as that it may pass into the atmosphere without carrying away any of the zinc; N, a place for opening into the chamber B, to clear out the refuse left from the prepared ore after the metal is separated. In this furnace the height of the fire-chamber A, below J, is intended to be sufficient to convert the oxygen in the air feeding the fuel entirely into carbonic oxide by the time it passes through the channel J, to enter the chamber B. The channel J, is made to descend towards N, to prevent any zinc from, at any time, flowing towards the fire-chamber A.

When the ore contains cadmium, arsenic, &c., I recom-

mend that a series of two, three, or more of the parts K, O, L, be added, connected one after the other, so that the zinc which is most easily condensed may be chiefly collected in the first recipient, whilst the more volatile cadmium, &c., will be received in the second or third: thus the zinc may be obtained in the first recipient more pure than if all the metals had been condensed together.

My invention does not relate to any peculiar mode of preparing the ore for reduction; but I prefer, when the ore is naturally in the form of an oxide of zinc, or is converted into an oxide previous to being operated on, to make it up into balls of about two inches in diameter, with the usual quantity of fine coal and a little clay, or such other substance as may be calculated to keep this prepared ore from falling into a powder in the chamber, whereby it might prevent the free circulation of the hot air around and amongst the prepared ore in the chamber B, whilst being reduced.

I would remark, that although I have described a mode of driving the air through a high column of coke, in order to convert the oxygen of the air into carbonic oxide, yet, to furthur ensure the entire conversion of all the oxygen into carbonic oxide, I recommend the precaution of filling at each operation, or charging the upper part I, of the furnace A, with bituminous coal, so that the heat will distil off carburetted hydrogen, to produce the effect upon the burnt air, of converting all the carbonic acid into carbonic oxide, by mixing therewith in passing through the channel J, before it arrives at or amongst the ore in the chamber B.

It will be obvious to those who are acquainted with the chemical principles upon which my invention is founded, that the ores of zinc may be placed along with the fuel in the chamber A, so as to produce ultimately a result similar to that which I have explained, provided, at the last part of

the operation or reduction, the air that has passed through the fuel has attained the condition hereinbefore mentioned of being without those properties or matters which would act upon metallic zinc; but I prefer keeping the fuel and the unreduced zinc separate, in the manner I have above described.

Having now described the nature of my invention, and the manner of performing the same, I would have it understood that although I have been particular in describing the construction of furnace or apparatus, and fuel I prefer, I do not confine myself thereto in respect of form, arrangement, or fuel, so long as it is suitably arranged for carrying out my invention. And I would have it understood, that what I claim as my invention is the reducing the ore or oxide of zinc, as hereinbefore described and explained, by means of a furnace, so arranged or contrived that the hot or burnt air, after passing through the fuel, shall, before or at the time it arrives amongst the ore or zinc, be deprived of the properties or matters which render necessary the enclosing of unreduced zinc and reduced zinc in the ordinary process, as described. — [*Inrolled in the Inrolment Office, May,* 1839.]

To Richard Rodda, *of the parish of St. Austle, in the county of Cornwall, assay-master, for his invention of certain improvements in furnaces, fire-places, and stoves, for the consumption of smoke and the saving of fuel, and in the mode of applying them to the generation of steam, the smelting of metals, and other works.*—[Sealed 7th August, 1838.]

The principle of my invention consists in certain arrangements of furnaces and fire-places, by which the smoke from

the more recently introduced fuel is made to pass through or amidst that portion of the fuel which has been longest ignited, and is still in a state of vivid combustion, and under or through the flame of the fuel more recently ignited, whereby a portion or the whole of the inflammable particles of which the smoke is composed, becomes ignited and is effectually consumed.

Figs. 1, 2, and 3, Plate XVIII., represent the invention as adapted to an ordinary waggon-shaped boiler; fig. 1, being a transverse section through the fire-place, and an end view of the boiler; fig. 2, a longitudinal section of the fire-place and boiler; and fig. 3, a plan or horizontal section of the fire-place: *a*, is the fire-place; *b*, the fire-bars; *c*, the ordinary fire-bridge; *d*, *d*, are two walls or partitions, perfectly formed of Welsh lump, and extending from the bridge towards the fire-door, about two-fifths of the length of the fire-bars, and about four inches distant from the sides of the fire-place, so as to form the two small side flues *e*, *e*, which are open at the front end, but closed at the hinder end by the bridge, being at that part continued up to the bottom of the boiler. The walls *d*, *d*, are at their upper sides, in contact, or nearly so, with the bottom of the boiler, and are supported at each end by pieces of fire-brick resting on the fire-bars, so as to leave a narrow aperture or slit *f*, of about two and a half inches in depth, or more, according to the size of the fire-place, between the underside of the walls and the top of the fire-bars; *g*, is a brick at the mouth of each of the side flues *e*, *e*, to prevent the ashes from entering into and choking the flues; *h*, is an arch or inverted fire-bridge formed of Welsh lump or iron, extending from the one wall *d*, to the other wall *d*, and leaving, between its underside and the top of the fire-bars, a free space or passage *h*, of from six to eight inches in depth, whilst the top of the bridge is in contact, or nearly

so, with the under side of the boiler: *m, m*, are a series of small apertures in the inverted fire-bridge, which may either be left open or plugged with fire-clay, according as may be found requisite. There is also a hole in or above the fire-door, furnished with a regulating valve to admit air into the furnace when required.

The fire-place is divided by the arch or inverted bridge *h*, into two parts or compartments *n*, and *o*; the compartment *n*, which is nearest to the fire-door, I denominate the fire-box, and the compartment *o*, (which is nearest to the bridge) the smoke-burner, the fire-box containing the most recently introduced fuel, and the smoke-burner that which has been longest in the furnace, and therefore in the most perfect state of combustion.

The effect of this arrangement is, that the smoke given out from the fresh fuel enters the side flues *e, e*, and passes through the slits or apertures *f*, into the midst of the fuel in the smoke-burner, and under or through the flame from the fuel in the fire-box, which sweeps under the arch into the smoke-burner, whereby the greatest portion, if not the whole, of the inflammable substance contained in the smoke becomes ignited, and is consumed.

Although, in illustration of my invention, I have represented it as applied to a waggon-shaped boiler, I do not confine its application to boilers of that description, as it is evident that the same arrangement is applicable to boilers of almost every form or construction.

I should also remark, that in cases where the fire-place is of great width, the small side flues *e, e*, instead of being straight, may make one more turn under the boiler between properly disposed partitions or walls, so as to cause the smoke and heated air to circulate under a greater surface of the bottom of the boiler before entering into the smoke-burner. And I would further remark, that instead of

forming the partitions *d, d,* and the arch *h,* of brick, either or all of them may be formed of a metallic vessel attached to the bottom of the boiler, and maintained constantly full of water either by means of suitable communications formed between the highest part of the vessel and the water in the boiler, or by means of a separate supply pipe and discharge pipe.

Figs. 4, and 5, represent a similar arrangement applied to a furnace for smelting metals; fig. 4, being a longitudinal section, and fig. 5, a horizontal section: *a,* is the roof of the furnace; *b,* the fire-bars; *c,* the bridge; *d, d,* two walls, formed of Welsh lump, extending from the bridge towards the door about two-fifths of the length of the fire-place, and at the distance of about four inches from the sides of the fire-place, so as to form the two small side flues *e, e,* which are partially open in front, but at the hinder end are closed by the bridge being at that part carried up to the roof of the furnace.

These walls are supported at each end upon pieces of fire-brick resting on the fire-bars, so as to leave a slit or aperture *f,* of about two and a half inches in depth between the under side of the wall and the top of the fire-bars: the top of the walls are in contact, or nearly so, with the roof of the furnace. A brick *g,* is placed across the opening of the side flues, to prevent their becoming choked with ashes: *h,* is an arch or inverted bridge extending from the one wall *d,* to the other wall *d,* leaving an aperture *k,* of six or eight inches in depth between its under side and the top of the fire-bars, the top of the inverted bridge reaches to the roof, or nearly so, of the furnace; *m,* one of the number of small holes in the inverted bridge, which may be left open, or closed by fire-clay, as circumstances may require. There is also a hole in or above the fire-door, furnished with a regulating valve to admit air to the furnace when required.

The space *n*, between the inverted bridge *h*, and the fire-door, and which contains the recent fuel, I denominate the fire-box, and the space *o*, which is between the inverted bridge and the bridge *c*, and which contains the most vividly burning fuel I call the smoke-burner.

For the convenience of removing the clinkers from the smoke-burner, instead of employing a single set of bars, extending the whole length of the fire-place, I employ two sets, one for the fire-box and one for the smoke-burner; the latter being sunk two or three inches below the former, and placed at right angles to them, and transversely to the length of the furnace; and an additional opening *n*, is made to the ash-pit, extending as high as the top of the slit *f*, or two or three inches above the top of the fire-bars in the smoke-burner. The effect of this arrangement is precisely similar to that of the arrangement shown in figs. 1, 2, and 3, the smoke from the fresh fuel in *n*, enters the side flues *e*, *e*, and passing through the slits *f*, amidst the intensely ignited fire in *o*, and under or through the flame from the blazing fuel in *n*, which sweeps under the arch *h*, into the smoke-burner *o*, is thereby wholly, or for the most part, decomposed, and its inflammable parts consumed. In cases where, from the comparatively small width of the fire-place, the side flues shown in figs. 1, and 3, would not be conveniently formed, I sometimes employ the arrangement exhibited in figs. 6, and 7, which represent my improvements as adapted to a marine boiler of the ordinary construction; fig. 6, is a longitudinal section of a portion of a boiler, and fig. 7, a transverse section of the same: *a*, is the top or roof of the fire-box; *b*, the fire-bars; *c*, the ash-pit; *d*, the flue; *e*, the partition which separates the ash-pit from the flue; on this partition is erected the bridge *f*, which is carried up to the roof of the fire-box, and is perforated by a number of apertures of any

convenient form, so that the bridge may retain the fuel, and at the same time allow a ready passage to the flame and heated air into the flue. Within the flue, at a short distance from the partition *e*, is erected a second bridge *g*, to direct the flame and heated air against the roof of the flue. In the fire-door is a hole furnished with a regulating valve, to admit air to the furnace when required. The fuel in the fire-box is at the hinder end, heaped up against the bridge, nearly to the roof of the fire-box, and the smoke from the fresh fuel being by the draught of the flue drawn through the mass of fuel in a state of vivid combustion, which is heaped against the bridge, the inflammable matter contained in the smoke becomes thereby ignited, and wholly, or in a great measure, consumed. A door *z*, is placed in the lower part of the partition *e*, by which any ashes which may fall through the apertures in the perforated bridge *f*, may be removed, and also access be had to the flue when required. The perforated bridge may be formed of metal, but I prefer Welsh lumps or fire-brick for the purpose: figs. 8, 9, and 10, exhibit my improvements applied to a stove or grate; fig. 8, is a front elevation; fig. 9, a longitudinal section, and fig. 10, a transverse section: *a, a,* are the bottom bars of the grate; *b*, the front bars; *c, c,* the two ends or sides of the grate, in one of which is an opening communicating with a flue *e*, which leads into the chimney *f*; the side opening is about half the depth of the grate, and the lower part is on a level with the bottom bars of the grate. In the front of this opening is a grating or perforated plate *d*, formed of fire tile or any other suitable substance, and serving to prevent the mass of fuel from falling into the flue *e*; and any small portion which may pass through the apertures of the plate may be removed at a small sliding door *g*; *h*, a hob at that end of the grate which is next the flue *e*, and covering about

one-third of the top of the grate; *k*, a moveable lid, covering the remainder of the top of the grate; *m*, a sliding or hanging door, closing in that portion of the front of the grate which lies under the cover *k*; *n*, another door which encloses the remainder of the front of the grate; *o*, a register or damper in the chimney below the part where the side flue *e*, opens into the chimney. In this grate the fuel is introduced at the cover part *k*; and that portion of the fuel which is the most intensely ignited, is heaped up against that end of the grate which is in communication with the side flue and the cover *k*, being laid on the damper *o*, shut, and the doors *m*, and *n*, wholly or nearly closed, the smoke from the fresh fuel is in its passage to the flue *e*, compelled to pass through the mass of burning fuel heaped against the perforated plate, whereby it is wholly, or in a great measure, decomposed, and its inflammable part consumed. When the fuel ceases to give out smoke, the doors *m*, and *n*, may be opened, the cover *k*, removed, and the damper *o*, opened; the grate then becomes an open fire-place, the heated air passing up the chimney. Although I have described the flue *e*, as communicating with one end of the grate, it may communicate with the back instead, or with both ends, or with the back and end perforated plates or grates being placed accordingly.

Having thus described my invention, and shown various methods of applying it according to the purposes for which it may be required, I proceed to define the extent of my claims to invention: first, I claim the combination of the inverted bridge *h*, and the side flues *e*, *e*, as set forth in the description of the figs. 1, 2, and 3, and figs. 4, and 5, and the construction of which has been described, whereby the smoke from the fresh fuel is compelled to pass through a mass of intensely burning fuel and under a sheet of

flame; secondly, I claim the perforated bridge *f*, shown in figs. 6, and 7, whether used alone or in conjunction with the second bridge *g*; thirdly, for stove grates or ranges, I claim the flue or flues *e*, whether at the sides or back of the grate communicating with the lower part of the grate or fire-chamber, immediately above the bottom bars, when used in conjunction with doors or shutters, to enclose the front and top of the grate; but I do not limit myself to the particular form and construction shown in figs. 8, 9, and 10.—[*Inrolled in the Inrolment Office, February,* 1839.]

To Joseph Gibbs, *of East Smithfield, in the county of Middlesex, engineer, and* Augustus Applegath, *of Crayford, in the county of Kent, calico-printer, for their invention of certain improvements in the construction of railroads, bridges, piers, jetties, and aqueducts, parts of which improvements may be applied to other useful purposes.*—[Sealed 20th June, 1833.]

By this invention it is proposed to support railways, viaducts, and similar works, upon cast iron pillars or columns; and the principal feature of novelty in the specification, is a method of securing these columns in their proper position. Plate XVIII., fig. 12, represents a section the lower part of a column secured according to their improvements. The ground being properly prepared, that is made level and hard by stamping or other means, an iron plate *a*, of any desired length, and capable of receiving, perhaps, two or three columns side by side, is placed flat on the surface of the ground; a hole being first made in the iron plate, one is bored in the ground, and a tube *b*, passed into it. A strong iron rod *c*, having two broad expanding arms *d*, *d*, attached to the end of it, is passed down the tube *b*, and

driven into the ground. The rod *b*, is shown detached at fig. 13; and it will be seen that in this figure the expanding arms are closed, and in the position they would be whilst being driven into the ground; the upper end of the rod *b*, is formed as a screw, and when it has been driven a sufficient depth into the ground, the nut *e*, at the top must be turned round in order to raise the rod; and as it rises, the arms *d*, *d*, will expand and come into the position shown in fig. 12; by this means, as the screw nut *e*, is turned, the earth between the iron plate *a*, and the expanding arms *d*, *d*, will become compressed and solidified.—[*Inrolled in the Inrolment Office, December*, 1833.]

To HARRISON GRAY DYAR, *late of Cavendish-square, but now of* 286, *Regent-street, gentleman, and* JOHN HEMMING, *of Edward-street, Cavendish-square, gentleman, both in the county of Middlesex, for their invention of improvements in the manufacture of carbonate of soda.* —[Sealed 30th June, 1838.]

THE nature of our invention consists in the use of carbonate of ammonia (that is, the sesqui-carbonate or bicarbonate), in the manufacture of carbonate of soda, by applying it to decompose common salt, and also in afterwards restoring or recovering the ammonia which has been so used, or the greater part thereof, in such a way as to allow of its being used again to convert other portions of common salt into carbonate of soda, thus repeatedly producing successive portions of carbonate of soda from the same portion of ammonia. To render the description of our process more intelligible, we divide it into two parts. The first part being the description of our method of using the sesquicarbonate or bicarbonate of ammonia in the manufacture

of carbonate of soda. The second part being the description of our method of restoring or recovering the ammonia, or the greater part thereof, in such a way as to be again employed in converting other portions of common salt into carbonate of soda.

As to the first part:—The carbonate of ammonia of commerce is what the chemists call the sesqui-carbonate, and in describing our process, we shall use the term carbonate of ammonia, as denoting the sesqui-carbonate. The bicarbonate is not generally met with, but is to be preferred when it can be obtained; and, accordingly, in reproducing the ammonia, we recommend the process to be carried on in such a manner as to produce as much of the bicarbonate as possible. We take nearly equal quantities by weight of common salt, otherwise called chloride of sodium or muriate of soda, and of carbonate of ammonia. We dissolve the common salt in as much water as is barely sufficient to dissolve it, so as to constitute a fully saturated solution, and when so dissolved, we add to it the carbonate of ammonia in the solid form, but bruised or pounded to a state of fine powder. We prefer that the common salt should be the substance dissolved, and to add to it the said carbonate of ammonia in a pulverized state; but the result may be obtained by dissolving the ammonia, and adding the common salt in a state of powder: but according to our experience this is not quite so well. We mix these well together, and suffer them to remain thus mixed from ten to twenty hours, stirring or agitating them from time to time, to prevent the solid parts from settling before the chemical action is sufficiently complete. We then drain or filter the liquid from the solid matter, and in order to separate as perfectly as is convenient all the liquid from the solid matter, we press the substance in an ordinary hydraulic or screw press, or submit it to considerable

pressure by any other convenient mode. The solid matter thus obtained is chiefly a carbonate of soda, containing, however, more carbonic acid than is found in soda ash, or crystals of carbonate of soda of commerce. To remove this excess of carbonic acid, and to recover any ammonia contained in the carbonate of soda, we next place the solid matter so obtained, as aforesaid, in a retort or other convenient vessel, and heat it from about six hundred degrees to eight hundred degrees of Fahrenheit, until all the liquid and volatile matter contained in it is drawn off by that heat. The substance left in the retort is the carbonate of soda. We pass the matter thus volatilized into a cool chamber or refrigerating apparatus; an example of which is furnished by the lead balloons used in the condensation of carbonate of ammonia, in the usual manner, wherein the carbonate of ammonia becomes condensed; but any convenient mode of condensing ammonia may be adopted.

As to the second part:—The liquid separated from the solid matter, that is to say, from the solid carbonate of soda by the pressure in the operations described in the first part of this specification, or by filtration, contains in solution muriate and carbonate of ammonia, common salt, and probably also a small portion of the carbonate of soda formed. In order, therefore, to separate the carbonate of ammonia therefrom, we place it in a distilling vessel, and distil over the water and the carbonate of ammonia, and receive the product in a cask or proper vessel, which we keep filled with carbonic acid, obtained from any economic source, in order to prevent loss of ammonia; or instead of distilling over, as above described, the water and the carbonate of ammonia, we add to the liquid a solution of muriate of lime, or chloride of calcium, which is one of the results of our process, until a precipitate, which is chiefly carbonate of lime, ceases to fall. We separate this precipitated carbonate of lime by

filtration or other means from the liquid, which is then chiefly a solution of muriate of ammonia and common salt. We evaporate this by heat to a sufficient consistency, to enable us to separate the common salt (in cases where it is desirable to do so on account of the value of common salt), which being less soluble in hot or boiling water than muriate of ammonia, crystallizes first, and may be separated by well-known means. When the common salt is removed from the liquor (if desirable, or without that process if not thought worth while), we evaporate by gentle heat the muriate of ammonia to dryness, and mix it intimately with a sufficient quantity of pounded chalk, and heat the mixture in an iron retort or other proper vessel, until the carbonate of ammonia, formed by this operation, is sublimed and separated in the usual way. We receive this carbonate of ammonia in a chamber or vessel formed of lead or other suitable material, where it becomes condensed; and we make a communication by means of a pipe between this chamber or vessel, and another chamber or chambers. Into one or more of these chambers we cause the carbonic acid and other volatile matters to pass, which were expelled by heat from the carbonate of soda, formed, as before described, in the first part of this specification. We receive the carbonic acid into one or more of these chambers, for the purpose of preventing loss of ammonia, by converting free ammonia into carbonate of ammonia, or bicarbonate of ammonia; and if the carbonic acid from the soda is not sufficient for this end, we pass more into them, which we obtain from coal, coke, charcoal, or any other economic source, as well as a sufficient quantity of water, or vapour of water, to condense and save the ammonia. Or in order effectually to prevent the loss of ammonia, we pass into the last of the vessels or chambers we employ to receive and condense the carbonate of am-

monia, a sufficient quantity of muriatic acid gas, obtained by adding sulphuric acid to common salt, or from any other economic source. The muriatic acid gas combining readily with the free ammonia, or the carbonate of ammonia in vapour, forms muriate of ammonia, and thus precipitates in the chamber; by which operation we avoid any loss of ammonia that might otherwise ensue. The muriate of ammonia thus obtained we treat in the same manner as the muriate of ammonia separated from the liquids before described, so that this muriate of ammonia may be converted into carbonate of ammonia or bicarbonate. The carbonate of ammonia obtained or reproduced or recovered from distilling the muriate of ammonia with chalk, as hereinbefore described, as well as that obtained by the distillation of the liquid, as also hereinbefore described, or by any of the other modes hereinbefore described, we employ over again, to convert other portions of common salt into carbonate of soda, according to the plan detailed in the first part of this specification. The common salt separated from the muriate of ammonia, as before described, we again employ with other portions of common salt in subsequent operations. The residue found in the retorts after the sublimation of the carbonate of ammonia, is chiefly muriate of lime, or chloride of calcium, which may be used as before mentioned. In all the operations we have described for the manufacture of carbonate of soda, we employ vessels or apparatus of such construction as to expose the carbonate of ammonia employed as little as possible to the air, so that loss of ammonia may be prevented.

We do not claim as our invention, any particular form of vessels or apparatus in which our operations are conducted, nor any of the chemical substances above mentioned as such; but we claim as our invention or improve-

ments, the use of carbonate or bicarbonate of ammonia in converting common salt into a carbonate of soda, as hereinbefore described; and as this mode would be too expensive to be profitable, if we could not recover the ammonia used for this purpose, so as to make it available for repeated operations, we claim in combination with the former part of the process, as hereinbefore described, for recovering the ammonia which would otherwise be wasted.—[*Inrolled in the Inrolment Office, December,* 1838.]

To WILLIAM JEAKES, *of Great Russell-street, Bloomsbury, in the county of Middlesex, ironmonger, for his invention of a mode of applying ventilating apparatus to stoves constructed on Dr. Arnott's principle.*—[Sealed 22d October, 1838.]

THIS invention of a mode of applying ventilating apparatus to stoves constructed on Dr. Arnott's principle, will be seen by reference to Plate XVIII., in which fig. 1, is an external view or elevation of the stove; fig. 2, is a section of the same, taken vertically through the middle of the stove; and fig. 3, a horizontal section of the same: *a*, is the furnace, containing the ignited fuel in the interior of a box *b, b, b,* the lower part of which is lined with fire-brick at *c, c*; the grating or fire-bars are shown at *d*; and *e, e,* is the ash-pit, the air to support combustion being admitted through an adjustable ventilator in front of the ash-pit: the fuel is supplied at the door *f*, and the smoke rising into the upper part of the box, passes off through the lateral pipe *g*, into the chimney *h*; the upper part of the box *b, b,* is closed by a lid *i,* having flanges, which fall into a groove filled with sand, round the top edge of the box, and forming a sand packing. Such is the ordinary construction of

Dr. Arnott's stove, as described in his published treatise on that subject. Now, my invention is an improvement on Dr. Arnott's stove, consisting of an appendage by which a current of cold and pure atmospheric air may be brought in contact with the sides of the stove, and after being heated by that means, may be discharged into the room for the purpose of warming its atmosphere.

I surround the stove entirely by a casing *k*, *k*, *k*, *k*, which encloses it, forming air passages all round, and by means of a pipe or tube *l*, leading from any convenient opening, introduce atmospheric air, either from without the house or from any other apartment: this air is brought through an opening in the bottom of the casing at *m*, into the lower part of the chamber, and from thence rises up the passages *n*, *n*, at the sides of the stove, taking up the heat as it passes, and is ultimately discharged through openings in the top at *o*, *o*, into the room. By these means a constant current of warm air is supplied to the room, and that air which is cold, or has been rendered heavy by respiration, is drawn off through an opening *p*, and carried up a pipe *q*, into the chimney. Thus a constant circulation of the air in the room is effected, and a perfect ventilation obtained, which will be found to be a great relief in a close room where one of Dr. Arnott's stoves is used, having, as they always have, the mouth of the chimney closed at bottom.

When it is not required to introduce cold atmospheric air from without, I exclude it by moving the slide *r*, under the opening *m*, which shuts off the communication with the pipe or tube *l*, and opens an aperture *s*: through this aperture the atmospheric air of the room now passes in a current up the channels *n*, *n*, by the sides of the stove, and is discharged at top in a heated state, thus producing a circulation of air which warms the apartment; and if it is not considered necessary to withdraw the colder or heavier

parts of the air from the room, I close the aperture *p*, of the pipe or tube *q*, and shut off that communication with the chimney.—[*Inrolled in the Rolls Chapel Office, May*, 1839.]

Specification drawn by Messrs. Newton and Berry.

SCIENTIFIC NOTICES.

REPORT OF TRANSACTIONS OF THE INSTITUTION OF CIVIL ENGINEERS.

(Continued from p. 343.)

March 5, 1839.

The PRESIDENT in the chair.

"On the comparison between the power of Locomotive Engines and the effect produced by that power at different Velocities." By Professor Barlow, Hon. M. Inst. C. E.

In this communication the author attempts to lay down an appropriate method for computing the power of locomotive engines; and though this method will not serve to exhibit the absolute power of the engines, it may serve to exhibit the comparative power under different conditions. We know the number of cubic feet of water evaporated in any given time; the space passed over in that time; the diameter of the driving wheels; the length of stroke, and the capacity of the cylinder; we hence know how many cubic feet of steam have been employed, and consequently the mean number of cubic feet of steam produced from one cubic foot of water. Again, by experiments that have been made by different writers upon the elastic force of steam, we know the pressure per inch on the piston, and then making due allowance for the resistance of the atmosphere on the piston, the friction of the engine gear, &c., there remains the force that ought to be effective on the piston. This being reduced to the circumference of the wheel, should be equal to the resistance opposed by the load, which on a level plane consists of axle

friction, road resistance, and the resistance of the atmosphere to the engine and carriages. But this is assuming that the engine has a perfect action, without any waste, which, however much to be desired, can never be the case in practice. Thus comparing what ought to be done in overcoming resistance with what is done, we shall learn the amount of power wastefully expended.

The author then selects some experiments from those made on the North Star and Harvey Combe Engines, as reported by Mr. Wood to the Directors of the Great Western Railway, and illustrates by these the proposed method, and exhibits the results in tables.

From one of these experiments, it appears that the steam power expended per ton of the gross load amounts to 32lbs., whereas on a tolerably level line it is generally assumed that the retardation of such a load does not amount to more than 9lbs. per ton; so that there appears to have been a power expended more than three times as great as the mechanical resistance to which it was opposed, according to views hitherto taken on the subject.

The author then proceeds to consider the resistance to railway trains at different speeds, and these resistances he refers to, 1st, That of the atmosphere. 2nd, The friction of the axles. 3rd, The road resistance. He discusses several experiments made by Mr. Wood, and remarks on the great discrepancies which they present—the atmospheric resistance in one case amounting to 353lbs., and in another to 99·7lbs. at the same velocity, viz., 32½ miles per hour; the friction in the former case being 5 or 6lbs., and in the latter 20lbs. per ton. The results of the best experiments on the atmospheric resistance and on friction show that the former must be considered to vary nearly as the square of the velocity, and the latter to be constant, or independent of the velocity; but this law of the constancy of friction, owing to the peculiar circumstances of the case, cannot hold with respect to the axles of railway trains.

Very much must be attributed to the increase of the road resistance as due to the deflection of the rails at high velocities,

and to the state of oscillation to which all the parts of the carriages are subject, and the imperfection of the joints. The author proceeds to make some observations on the actual state of our knowledge with respect to the atmospheric resistance, and the effect of inclined planes on the working of a line of railway. The speed in descending planes is limited by considerations of safety, and in planes of $\frac{1}{96}$ $\frac{1}{100}$ and $\frac{1}{220}$ it is not safe to descend with heavy loads at a greater mean rate than is attainable with the same load on a level; that on planes between $\frac{1}{750}$ and a level the whole attainable speed is admissible.

The method of inferring the power of an engine from the quantity of water evaporated was objected to on the grounds that so much water is lost by priming.

With respect to the resistance due to the imperfection of the joints, it was remarked that engineers are generally so much restricted as to the expense of making the joints of rails, they cannot adopt that which is the best; and it is a question well worthy of attention, whether the best kind of joint is not the most economical, as the wear and tear would be diminished, and the comfort of the passengers increased, by attention to this point.

The experience of the Dublin and Kingstown Railway showed that great advantages would result from a better kind of joint being used. This railway, though so short, and only having been finished about three years, has had perhaps more frequent traversings than a longer railway would in fifteen years; the trains started every half hour, and frequently the departures were increased to every quarter of an hour: the opportunities of observing the effect of the carriages upon the rails were therefore excellent.

"Description of a Machine called a Floating Clough." By George Ellis, Grad. Inst. C. E.

The machine here described is used for scouring a channel which leads from the Winestead Drainage and Haven of Pattring-

ton, into the river Humber. It is constructed in the following manner:—The frame is made of timbers 6 inches by 4, 12 feet long, 9 wide, and 6 deep. This frame is covered with planking 2 inches thick, and through the middle of it a culvert is formed with planks, 2 feet 6 inches in width, with a small lifting door at one end. Connected with the bottom and projecting in front are too long beams called feelers, which keep the machine in its course, and in the front are frames of wood shod with rough iron like the teeth of a saw, and these are connected with racks which can be raised by a lever.

At each side of the machine there is a wing which is made to fit the slope of the banks, to dress the mud from the sides, and to keep up the water behind the machine.

At high tide the machine is moored in the middle of the channel, the wings are extended and kept so by ropes, and when the tide is at half ebb the plugs are taken out, and the water rises about 2 feet in the machine, which causes it to sink; the plugs are replaced, and thus it remains till full ebb, when the iron-shod frames are let down in front, and the tide forces the whole machine, which is like a great dam, gently down the stream, scraping with it all the mud down to the river, where it is emptied, and floated back with the return tide. The whole distance, about three miles, is performed in two hours. A machine of the same kind is used with great advantage at Great Grimsby.

March 12, 1839.

The President in the chair.

"Description of the machinery and the several processes for converting refined metal into malleable finished iron at the Rhymney Works." By Josiah Richards, Assoc. Inst. C. E.

In this paper the author explains and describes the elaborate drawing of puddling furnaces, forge and rolling mills, at the Rhymney Iron-works, presented by him last session to the Institution, and the various processes necessary for converting refined metal into finished malleable iron. Each puddling furnace usually receives as a charge 4½ cwt. of refined metal, which

is worked by the puddlers into six puddle balls in about an hour and a half. There are three sets of puddlers to each furnace, who relieve each other every five charges. The puddled balls are drawn on wheeled trucks either to the hammer, weighing about 4½ tons, with a fall of 20 inches, where each receives about twenty-five blows, or to the squeezer; but this latter method does not get rid of the impurities so effectually as the former. The ball is then passed through a continually decreasing series of grooves in rollers, whereby it becomes puddled, or No. 1, bar. The bar is then cut into short lengths, allowed to cool, and made into piles of a particular weight and size, according to the description of the iron that is to be rolled; these being placed in a furnace are brought to a welding heat, and then passed through rolls and reduced to the requisite size, when they become No. 2, bar. The same operation of cutting, filing, heating, and rolling, being again gone through, the iron becomes No. 3, bar, or railway iron. No. 3 iron may be made from a pile, of which the top and bottom are of No. 2 iron, and the middle of No. 1. It is then brought to a welding heat, and hammered so as to be soundly welded; being again heated, it is rolled into No. 3, or railway iron.

The rail is received from the rolls on a carriage, and carried to a circular saw, where one end is cut off; the rail is then allowed to cool, and afterwards the other end is heated, and the rail cut to the required length.

March 19, 1839.

The PRESIDENT in the chair.

On Mr. Smeaton's "Estimate of Animal Power, extracted from his MS. Papers." By John Farey, M. Inst. C. E.

The amount of mechanical power has been frequently overstated, in consequence of the conclusions being drawn from efforts continued for too short a time. Desaguliers estimated the power of a man as equal to raising 5507lbs. one foot high per minute: this was found by Smeaton to be too high; several experiments are recorded, in which different values are assigned to the power

of a man, and he ultimately fixed it at about two-thirds of the above, or 3672lbs. Several experiments are recorded of the estimate of the power of a horse, and of the quantity of water raised by various machines.

The communication is accompanied by a letter in Mr. Smeaton's hand-writing, dated 21st Feb., 1789.

"Account of the firing of gunpowder under water, by the voltaic battery at Chatham, March 16, 1839, under the direction of Col. Pasley." By F. Bramah, jun., A. Inst. C. E., and C. Manby, A. Inst. C. E.

Exp. 1.—A tin canister containing 45lbs. of powder was sunk in deep water, and the coil containing the conducting wires one-fifth of an inch in diameter, by which the powder was to be fired, was veered out to its whole length of 500 feet from the boat in which the voltaic battery was placed. The connexion being made the explosion was instantaneous, and the concussion was felt very sensibly on the shore.

Exp. 2.—Three canisters, each containing a charge of 5lbs., were sunk at a distance of 50 or 60 feet from each other, and a pair of connecting wires, 100 feet long, were attached to each; the ends of these wires were soldered together by threes, and on the connexion being made only one of the canisters was fired. The wires in this experiment were of common copper bell wire, about one-sixteenth of an inch in diameter. The voltaic battery used was one of Professor Daniell's improved construction. The preparation of the conducting wires, and the manner of discharging the battery, appeared the same as described in Mr. Bethell's communication of last session.

List of Patents

Granted by the French Government from the 1st April to the 30th June, 1838.

(Continued from p. 345.)

To Hippolite Delageniere, of Paris, for a method of making terrasse-coverings for roofs of houses.

To Germinal Veyrassat, of Paris, for a new shade and reflector for every kind of chandelier.

PATENTS FOR FIVE YEARS.

— Jean Baptiste Dulché, represented in Paris by Mr. Perpigna, Advocate of the French and Foreign Office for Patents, Rue de Choiseul, for new fittings for setting type.

— Charles Wise, represented in Paris by Mr. Perpigna, for an improved apparatus for bleaching rags for the making of paper.

— César Paciny, of Clermont-l'Herault, represented in Paris by Mr. Perpigna, for improvements calculated to prevent the smoke from being driven down the chimneys by the wind.

— Etienne François Philippe Carle, of Marseille, represented in Paris by Mr. Perpigna, for improvements in book-binding.

— Benjamin Theodore Levasseur, of La Rochelle, and Ferdinand Gangneux, of Rochefort, represented in Paris by Mr. Perpigna, for a machine to sweep streets and public places.

— Boudard, jun., of Chaumont, represented in Paris by Mr. Perpigna, for improvements in sewing gloves.

— Auguste Boisonneau, of Paris, for an oculary prothesis, by which are determined the dimensions and colours of artificial eyes.

— Jean Marie Jamin, of Paris, for a means of making periscopic glasses.

— Jean Paul Laroze, of Paris, for a portable medicine chest.

— Cesar Luc Louis Oudinot Lutel, of Paris, for the weaving of whalebone mixed with worsted, silk, &c.

— Camille Prosper Bridault, of Paris, for improvements in umbrellas.

— Jean Louis Geoffroy Muhlbacher, of Paris, for a new system of springs for carriages.

— Claude Duclos, of Paris, for a new steam engine.

— Jacques Lecointe, of Paris, for a new hydraulic machine.

— Thomas Martin Ménage, of Paris, for a new lamp-burner.

— D. Muller and Co., of Guerrus, for improvements in presses used in copper-plate printing.

To Benoist Bouillon, of Lyon, for an improved batten for the weaving of silk.

— Jean Marie Chapuis, of Mulhausen, for a means of printing stuffs, papers, &c.

— Jean Julien Josselin, of Paris, for mechanical stays.

— Matifas and Legay, of St. Eloi, for an apparatus called continuous concentrator, for the making of beet-root sugar.

— Joseph Alexandre Robert, of Paris, for an improved bellows.

— André Rimlinger, of Remering, for an economical stove.

— Claude Bruel, of Belleville, and Pierre Antoine Fédix, of Paris, for a new means of using new or old rags, and a machine for executing the said operation.

— François Narcisse Coquet, of Passy, for improvements in sinks and drains.

— Jacques Victor Fagot, of Maromme, for improvements in the printing of cottons.

— Pierre Joseph Fessin, of Paris, for ornaments applicable to typographic printing.

— Gabriel Gibus, jun., of Paris, for improvements in hats.

— Alexandre Lebrun, of Paris, for a new coffee-pot.

— Philibert Andrien Terrat, of Paris, for an improved plaster for the cure of the farcy.

— Jean Boivin, of St. Etienne, for improvements in Jacquart looms.

— Amand Bordeaux, of Rouen, for a hand-mill.

— Auguste Charpentier and Paul Brignol, of Paris, for curling irons.

— Jean Henri Gonder, of Chateauvieux, for a means of preserving wine.

— Louis Noyelle, of Amiens, for a machine for preparing mohair.

— Raymond Bellas, of Lodive, for improvements in machines for carding worsted and cotton.

— Louis Dubois, of Paris, for improvements in clocks.

— Joseph Felix Jules Gallard, jun., of Paris, for a new beverage.

— Claude Jaillet, of Lyon, a new method of manufacturing figured fabrics.

To Alphonse Moreau, of Blanc, for a mechanical slide for regulating the power of the blast in blast furnaces.

— Jean Jacques Santini, of Paris, for a new desk.

— Charles Bonnet, of Paris, for a process of gilding metals.

— George David Frederic Grienne, of Paris, for an improved reaping machine.

— Louis Hallé, of Paris, for an improved mannikin for painters.

— Gabriel Hippolyte Moreau, of Paris, for a machine for drying walls.

— Gabriel Hippolyte Moreau, of Paris, for an apparatus to facilitate the escape from windows in case of fires.

— Felix Lebel, of Paris, for a new kind of fan.

— Adolphe Mariehenry Bertrand, for an improved method of carbonising wood.

— Michael Booke, jun., for a new plug to shot bags giving the charge of itself.

— André Cointry and Sons, of Nantes, for a stove to carbonise earthy materials.

— Louis Drouhin, of Paris, for a machine for setting saws.

— Pierre Dufaure, of Montmirail, for improvements in buckles.

— Benjamin Théodore Levasseur, of La Rochelle, for a new system of marking to be used in various games.

— St. Etienne, father and son, of Paris, for an apparatus for drying all kinds of grain, starch, &c.

— Auguste Léon Philibert Bergonier, of Paris, for medicinal vapour baths.

— Jean Pierre Louis Joseph Chapelle, of Paris, for a new method of ornamenting metals.

— Sylvain Marie Emile Cournot, of Paris, for a grinding machine.

— Albert Jourdain, of Paris, for elastic mattrasses.

— François René de Lacour, of Paris, for a new carriage.

— Hector Ledru and Laurent, of Paris, for a new process of dyeing.

— Alexis Joseph Edme Morin de Gueriviére, of Paris, for a new system of marking to be used in various games.

— Jean Louis Constant Pipereau, of Rambouillet, for a new spring for carriages.

To François Baudry, of Paris, for a new system of beds.
— Jean Cougny, of Paris, for an improved blacking.
— André Germain Monbarque, of Paris, for improvements in water closets.
— François Arosa, of Paris, for improvements in asphaltes.
— Auguste Kock, of Nancy, for a new stove.
— Sébastien Bernard, of Lyon, for an improved batten.
— Ernest Dugnerchet, jun., of Lorient, for a composition to clean copper, brass, &c.
— Jacques Frederic Methey, of Thann, for improvements in looms.
— Angélique Edouard Milbert, of Paris, for a method for arching cellars with economy.
— Gustave Rodolphe Henri Silbermann, of Strasbourg, for two printing presses.
— Pierre François Coade, of Paris, for improvements in nail-making machines.
— Robillard and Loisy, of Arras, for a new system of boiler used in the manufacturing of beet-root sugar.
— Ellen Purkif, of Amsterdam, for an instrument to accelerate and improve writing.
— Henri Lesobre, of Reims, for a gas meter.
— Jacques François Aubin, jun., of Rouen, for improvements in spinning machines.
— Jacques Lecomte, of Montrouge, for a mechanical means of raising water to a considerable height without horses or steam.
— Pierre Louis Geoffroy Obin, of Paris, for a sucking bottle for suckling infants.
— Jean Dominique Ardin Delteil, of Paris, for a vegetable soap.
— Cousin, sons and brothers, of Bordeaux, for a windlass with compound levers.
— Senateur Levieux, of Tonville, for improvements in looms.
— François Mathieu, of Paris, for improvements in shoes and boots.
— Louis Auguste Paturel and Jean Claude Adrien Petit, of Paris, for a new method of employing caoutchouc either pure or dissolved.

List of Patents

Granted in Scotland between 22d July and 22d August, 1839.

To John Evans, of Birmingham, paper manufacturer, for improvements in the manufacture of paper.—Sealed 23d July.

— John Alexander Eleazar Dezgrand, of the Boulevard, Paris, now of Covent-garden, London, for improvements in the production of motive power, and in the machinery for applying the same to useful purposes.—Sealed 23d July.

— Edouard François Joseph Duclos, now of Leicester-place, Leicester-square, London, for improvements in the manufacture of zinc, copper, tin, and antimony.—Sealed 23d July.

— Charles de Laveleye, of the King's Head, Shoe-lane, London, engineer, for improvements in the manufacture of bricks.—Sealed 23d July.

— Theodore Cotelle, of the Haymarket, London, civil-engineer, for improvements in extracting salt from sea or salt water, and rendering it pure and drinkable, and in purifying other waters. —Sealed 23d July.

— William Newton, of the Office for Patents, Chancery-lane, London, civil-engineer, communicated by a foreigner residing abroad, for certain improvements in engines to be worked by air or other gases.—Sealed 31st July.

— Robert Griffiths, of Smethwich, Staffordshire, for certain improvements in the construction of presses, which improvements are also applicable to the raising of weights.—Sealed 31st July.

— Joseph Jennings, of Bisson-bridge, in the parish of Ker, in the county of Cornwall, assay-master, for a process for obtaining metal from pyrites or mundic.—Sealed 31st July.

— Christopher Binks, of Newington, near Edinburgh, for certain improvements in obtaining or manufacturing chlorine, and certain compounds of chlorine applicable in bleaching.—Sealed 2d August.

— David Stead, of Great Manchester-street, London, merchant,

for an improved mode or method of making or paving public streets and highways, and public and private roads, paths, courts, and bridges, with timber or wooden blocks.—Sealed 6th August.

To George Shuttleworth, of the Mount, near Sheffield, soap-boiler, for a new method of obtaining a rotatory motion from the rectilinear motion of the piston rod of a steam or other the like engine.—Sealed 8th August.

— John Rostron, of Edenfield, in the county of Lancaster, cotton-spinner, for certain improvements in looms for weaving.—Sealed 16th August.

— George Holworthy Palmer, of Surrey-square, Old Kent-road, civil-engineer, for certain improvements in paddle-wheels for propelling ships, boats, or other vessels, navigable by steam or other motive power.—Sealed 16th August.

— John Mercer, of Oakenshaw, Lancashire, calico-printer and chemist; John Dynely Prince, the younger, of Manchester, calico-printer, and William Blythe, of Church, in the said county, manufacturing chemist, for certain improved processes to be used in the printing, dyeing, or colouring of cotton, woollen, silk, or other cloths and yarns.—Sealed 17th August.

— Henry Hornby, of Blackburn, in the county of Lancaster, cotton-spinner, and William Kenworthy, of the same place, for certain improvements in the machinery or apparatus for sizeing and otherwise preparing cotton, wool, flax, and other warps for weaving,—Sealed 17th August.

— To John Buchanan, of Glasgow, coach-builder, and William Bridges Adams, of Porchester-terrace, Bayswater, Middlesex, gentleman, for certain improvements in the construction of wheel carriages, parts of which improvements are also applicable to machinery for propelling, and also for the purpose of securing ships and other vessels, and for communicating motion between different portions of machinery.—Sealed 22d August.

New Patents
SEALED IN ENGLAND.
1839.

To William Colchester, of Ipswich, merchant, for an improved soap-frame.—Sealed 29th July—6 months for inrolment.

To Christopher Nickels, of York-road, Lambeth, gentleman, for improvements in cutting India-rubber.—Sealed 1st August—6 months for inrolment.

To Louis François Feuillet, of George-yard, Lambeth-street, gentleman, for improvements in casting type for printing.—Sealed 1st August—6 months for inrolment.

To Samuel Sydney Smith, of Suffolk-place, Hackney-road, for certain improvements in machinery for raising water.—Sealed 1st August—6 months for inrolment.

To Joseph Webb, of Huddersfield, for improvements in machinery for raising the pile of woollen and other cloths. —Sealed 1st August—6 months for inrolment.

To Alphonse Rene Le Mire De Normandy, of Cheapside, D.M., for certain improvements in the manufacture of inks and dyes.—Sealed 1st August—6 months for inrolment.

To William Abbott, jun., of Wyndham-place, Middlesex, gentleman, for improvements in the manufacture of felt.—Sealed 1st August—6 months for inrolment.

To Thomas Knowles, of Manchester, Lancaster, cotton-spinner, for certain improvements in machinery or apparatus used in the preparation of cotton and other fibrous substances.—Sealed 1st August—6 months for inrolment.

To William Miller, of Clithero, Lancaster, engineer, for certain improvements in grates used in steam engines or other furnaces or fire-places.—Sealed 1st August—6 months for inrolment.

To Pierre Jaques Ferier, of Paul's-chain, St. Paul's-

churchyard, jeweller, for certain improvements in the construction of vapour and hot-air baths.—Sealed 1st August —6 months for inrolment.

To Samuel Guppy, of the city of Bristol, merchant, for improvements in a certain process and apparatus used in the manufacture of soap.—Sealed 1st August—6 months for inrolment.

To William Morrett Williams, of Bedford-place, Commercial-road, for an improved lock and key.—Sealed 1st August—4 months for inrolment.

To John Humphries, of Kidderminster, carpet-manufacturer, for certain improvements in the manufacture of carpets and rugs.—Sealed 1st August—6 months for inrolment.

To John Mercer, of Oakenshaw, calico-printer; John Dynely Prince, of Manchester, calico-printer, and William Blythe, of Church, in the county of Lancaster, chemist, for certain improved processes to be used in the printing, dyeing, or colouring of cotton, woollen, silk, or other cloths and yarns.—Sealed 1st August—6 months for inrolment.

To Sir John Scott Lillie, of Kensington, Knt., for certain improvements in the application of elastic fluids to the working of machinery.—Sealed 1st August—6 months for inrolment.

To John Moore, of Broad Weir, Bristol, gentleman, for an improvement or improvements in the steam engine or steam-engine apparatus.—Sealed 5th August—6 months for inrolment.

To Jonathan Fell, of Workington, Cumberland, for improvements in building ships and other vessels.—Sealed 5th August—6 months for inrolment.

To Robert William Jearrard, jun., of Oxford-street, architect, for certain improved means of retarding wheeled carriages.—Sealed 6th August—6 months for inrolment.

To Joseph Whitworth, of Manchester, engineer, for

certain improvements in machinery, tools, or apparatus for planeing, boring, and cutting metals or other substances.—Sealed 7th August—6 months for inrolment.

To Thomas Burr, of Shrewsbury, lead merchant, for improvements in rolling lead and other soft metals.—Sealed 8th August—6 months for inrolment.

To John Fitzpatrick, of Stanhope-street, Clare-market, gentleman, for a new and improved method of making and manufacturing thread and linen, by means of a material not hitherto used for that purpose, being a communication.—Sealed 10th August—6 months for inrolment.

To Robert Varicas, of Burton-crescent, surgeon, for improvements in rendering fabrics and leather waterproof.—Sealed 10th August—6 months for inrolment.

To Nelson John Holloway, of Pentonville, gentleman, for an improved head for carriages, being a communication.—Sealed 13th August—6 months for inrolment.

To Henry Brown, of Mile End, Middlesex, for a new covering or plating for household furniture, picture frames, cabinet, and fancy work, and other articles of domestic and personal use, and the mode of making such covering or plating.—Sealed 13th August—6 months for inrolment.

To Miles Berry, of the Office for Patents, 66, Chancery-lane, patent agent, for a new or improved method of obtaining the spontaneous reproduction of all the images received in the focus of the camera obscura, being a communication.—Sealed 14th August—6 months for inrolment.

To James Capple Miller, of Manchester, gentleman, for certain improvements in printing calicoes, muslins, and other fabrics.—Sealed 15th August—6 months for inrolment.

To John Mason, of Rochdale, Lancaster, machine-maker, for certain improvements in machinery or apparatus for boring and turning metals and other substances.—Sealed 15th August—6 months for inrolment.

To William Bridges Adams, of Porchester-terrace, Bayswater, gentleman, and John Buchanan, of Glasgow, for certain improvements in the construction of wheel carriages, parts of which improvements are also applicable to machinery for propelling, and also for the purpose of securing ships and other vessels, and for communicating motion between different portions of machinery.—Sealed 16th August—6 months for inrolment.

To Joseph Schofield, of Littleborough, cotton-spinner, and Edmund Leach, of the same place, manager of cotton-spinners, for certain improvements in looms for weaving various kinds of cloths.—Sealed 17th August—6 months for inrolment.

To Matthew Uzielli, of King William-street, London, merchant, for improvements in the modes of impregnating wood or timber with chemical materials, being a communication.—Sealed 17th August—6 months for inrolment.

To George Augustus Kollman, organist, of her Majesty's German chapel, St. James's, for improvements in railways, and in locomotive and other carriages.—Sealed 17th August —6 months for inrolment.

To James Vardy, of Wolverhampton, Stafford, gentleman, and Moritz Platow, of Poland-street, Oxford-street, engineer, for improvements in making decoctions of coffee and other matters.—Sealed 17th August—6 months for inrolment.

To Stephen Joyce, of Croydon, in the county of Surrey, artist, for certain improvements in stoves for warming the air in buildings, which improvements are also applicable for cooking, or for communicating heat for other useful purposes.—Sealed 21st August—6 months for inrolment.

To Moses Poole, of Lincoln's-inn, gentleman, for improvements in introducing elastic materials into fabrics, to render them elastic or partly elastic, being a communication.—Sealed 23d August—6 months for inrolment.

To William Coles, of Charing-cross, Esq., for improvements in reducing friction of machinery used in propelling vessels, lathes, and other machines.—Sealed 23d August——6 months for inrolment.

To Charles Barwell Coles, of Allsop-terrace, New-road, gentleman, for improvements in the method of fixing and carrying fire-arms on horseback.—Sealed 23d August—6 months for inrolment.

To John Augustus Tulk, of Seaton Iron-works, Cumberland, for improvements in the manufacture of iron.—Sealed 26th August—6 months for inrolment.

To Henry Pinkus, of Old Slaughters' Coffee-house, St. Martin's-lane, gentleman, for improvements in the methods of applying motive power to the impelling of machinery, which improvements are applicable to several useful purposes.—Sealed 26th August—6 months for inrolment.

To James Bogardus, of Trinity-square, Tower-hill, gentleman, for an improved means of applying labels, stamps, or marks to letters and such other documents.—Sealed 26th August—6 months for inrolment.

To Thomas M'Gauran, of Golden-terrace, Pentonville, gentleman, for improvements in the manufacture of paper from a material not hitherto so employed.—Sealed 26th August—6 months for inrolment.

To John Muir, jun., merchant, in Glasgow, for certain improvements in the apparatus connected with the discharging press for conducting, distributing, and applying the discharging liquors and the dyeing liquors.—Sealed 26th August—6 months for inrolment.

END OF VOL. XIV.

CELESTIAL PHENOMENA, for September, 1839.

D.	H.	M.	
1			Clock after the sun, 0m. 0s.
	—		☽ rises 10h. 10m. A.
	—		☽ passes mer. 6h. 20m. M.
	—		☽ sets 3h. 30m. A.
	16	12	Vesta in conj. with the sun.
2	1	3	☿ in inf. conj. with the sun.
4			Gambart's Comet R. A. 10h. 56m. dec. 0. 33. S.
			Ditto passes mer. 0h. 3m.
5			Clock after the sun, 1m. 57s.
	—		☽ rises 1h. 55m. M.
	—		☽ passes mer. 10h. 9m. M.
	—		☽ sets 5h. 59m. A.
6	14	10	☿ in conj. with the ☽ diff. of dec. 4. 1. S.
7			⊙ eclipsed, invis. at Greenw.
	7	30	♅ in oppo. to the ⊙
	10	21	Ecliptic conj. or ● new moon.
8			Gambart's Comet R. A. 11h. 10m. dec. 2. 5. S.
			Ditto passes mer. 0h. 1m.
10			Clock after the sun, 2m. 57s.
	—		☽ rises 8h. 16m. M.
	—		☽ passes mer. 1h. 42m. A.
	—		☽ sets 6h. 55m. A.
	4	13	♀ in conj. with the ☽ diff. of dec. 4. 6. S.
	11	57	♃ in conj. with the ☽ diff. of dec. 4. 32. N.
	15	26	☿ stationary.
11	4	8	Juno stationary.
12			Gambart's Comet R. A. 11h. 24m. dec. 3. 55. S.
			Ditto passes mer. 23h. 59m.
	8		☽ in Apogee.
	16	1	♂ in conj. with the ☽ diff. of dec. 3. 58. N.
13	2	21	♀ stationary.
14	5	16	♄ in conj. with the ☽, diff. of dec. 6. 57. N.
15			Clock after the sun, 4m. 41s.
	—		☽ rises 2h. 15m. A.
	—		☽ passes mer. 5h. 31m. A.
	—		☽ sets 8h. 43m. A.
	2	31	☿ in the ascending node.
16			Gambart's Comet R. A. 11h. 38m. dec. 5. 1. S.
			Ditto passes mer. 23h. 57m.
	2		☽ in □ or first quarter.
18			Mercury R. A. 10h. 36m. dec. 9. 36. N.
18			Venus R. A. 13h. 1m. dec. 14. 18. S.
	—		Mars R. A. 15h. 9m. dec. 18. 39. S.
	—		Vesta R. A. 11h. 19m. dec. 9. 10. N.
	—		Juno R. A. 1h. 37m. dec. 1. 45. N.
	—		Pallas R. A. 14h. 37m. dec. 9. 51. N.
	—		Ceres R. A. 14h. 32m. dec. 10. 55. S.
	—		Jupiter R. A. 13h. 21m. dec. 7. 27. S.
	—		Saturn R. A. 16h. 13m. dec. 19. 34. S.
	—		Georg. R. A. 23h. 2m. dec. 7. 2. S.
	—		Mercury passes mer. 22h. 49m.
	—		Venus passes mer. 1h. 18m.
	—		Mars passes mer. 3h. 22m.
	—		Jupiter passes mer. 1h. 34m.
	—		Saturn passes mer. 4h. 26m.
	2	53	☿ greatest elong. 7. 51. W.
	15	50	♀ greatest Hel. Lat. S.
19	16		☿ in Perihelion.
20			Clock after the sun, 6m. 27s.
	—		☽ rises 5h. 15m. A.
	—		☽ passes mer. 9h. 56m. A.
	—		☽ sets 1h. 25m. M.
21	17	53	♅ in conj. with the ☽ diff. of dec. 0. 42. S.
23	5	59	⊙ enters Libra. Autumn com.
	7	10	Ecliptic oppo. or ○ full moon.
24			Gambart's Comet R. A. 12h. 4m. dec. 7. 42. S.
			Ditto passes mer. 23h. 51m.
	10		☽ in Perigee.
25			Clock after the sun, 8m. 11s.
	—		☽ rises 6h. 25m. A.
	—		☽ passes mer. 1h. 18m. M.
	—		☽ sets 8h. 49m. M.
29	9	44	☽ in □ or last quarter.
	10	26	☿ in conj. with Vesta, diff. of dec. 2. 52. S.
30	0	25	☿ greatest Hel. Lat. N.

The eclipses of the Satellites of Jupiter are not visible from the 27th day of this month until the 17th day of November, Jupiter being too near to the sun.

J. LEWTHWAITE, Rotherhithe.

J. Cunningham, Printer, Crown-court, 72, Fleet-street.

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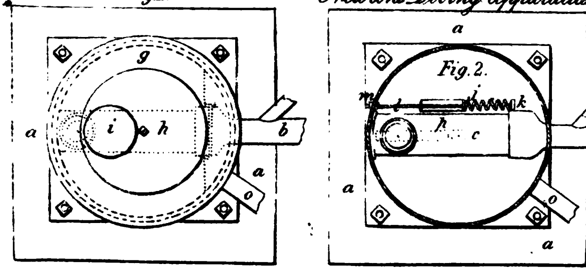
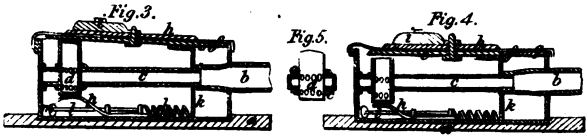
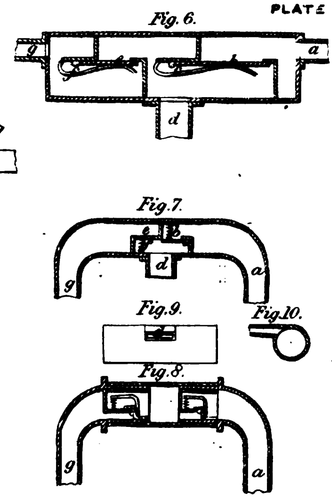
[CONJOINED SERIES.]

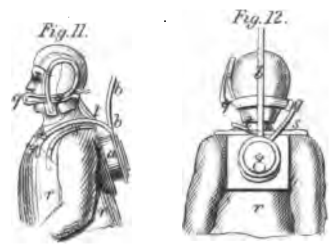
REPORT OF RECENT PATENTS.

Newton's Diving Apparatus.

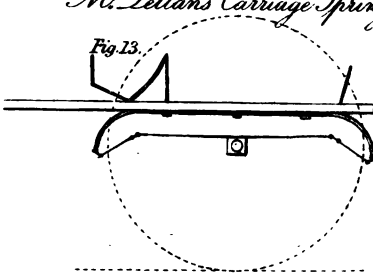




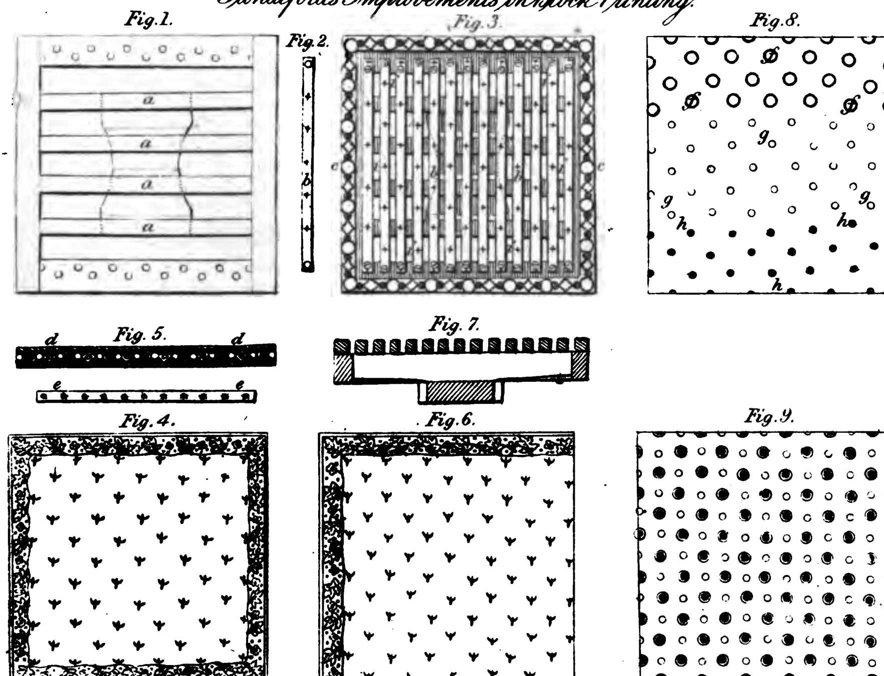




McLellan's Carriage Springs.



Sandiford's Improvements in Block Printing.



Newton del. April 1st 1859. E. Yates sc.

Garnett's Spinning Mach^y

Fig. 1

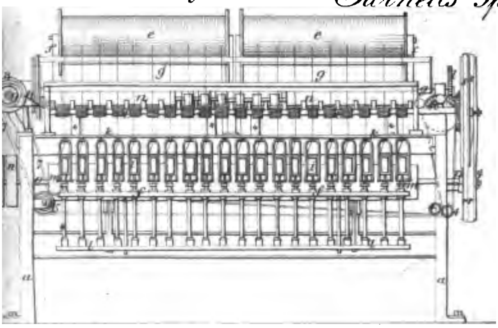


Fig. 3

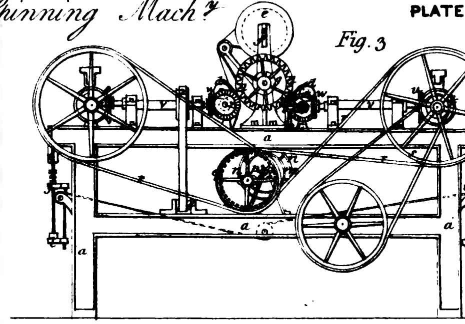


Fig. 2

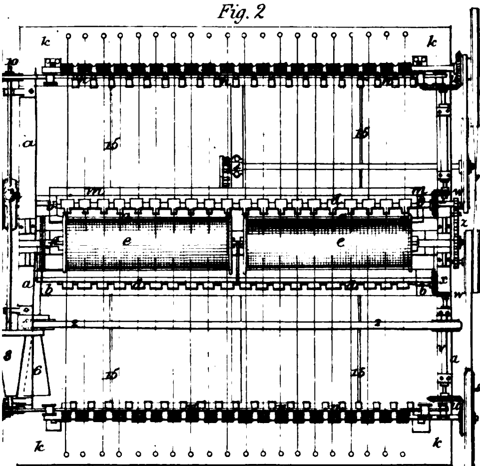
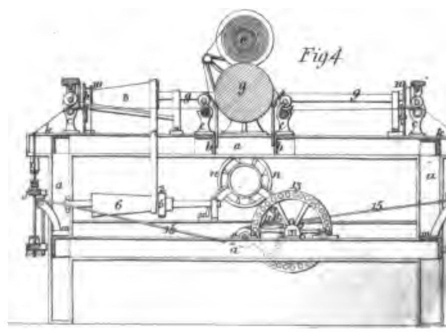


Fig 4



Bridson's Stretching Mach^y

Fig. 2

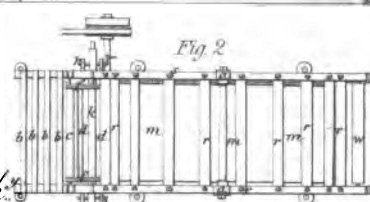


Fig. 3

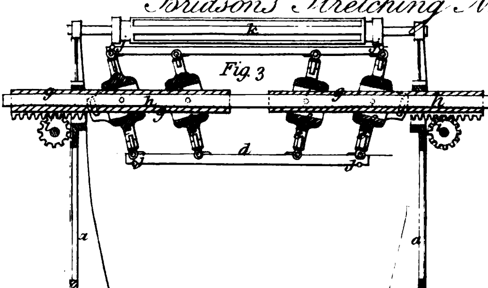
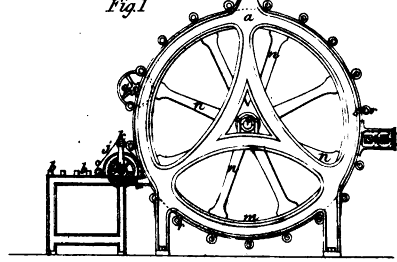


Fig. 1



Crellin & Holt's Water closet

Fig. 1

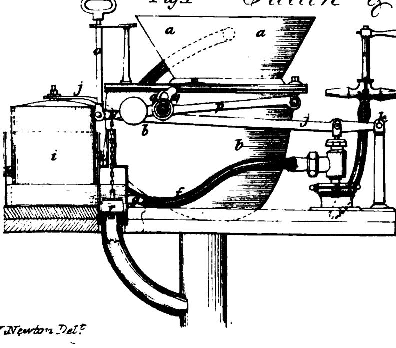


Fig. 2

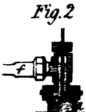
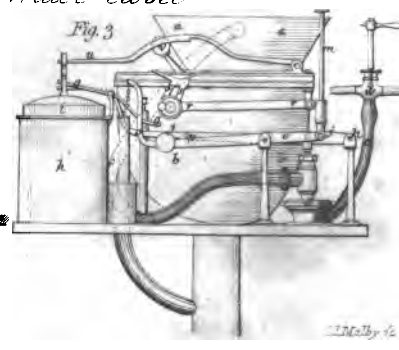


Fig. 3



W. Newton Del^t. 1st April 1839. J. Malby sc.

Price's Impd. Steam Boiler.

Fig. 2

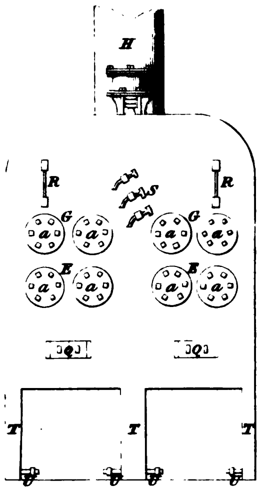


Fig. 1

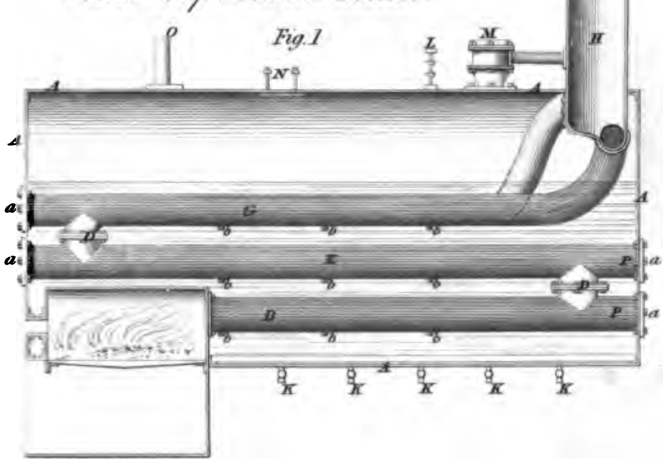


Fig. 4

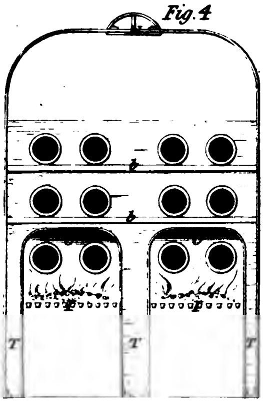


Fig. 3

Fig. 6

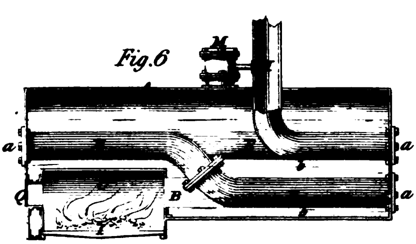


Fig. 7

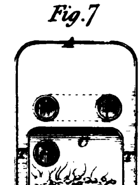


Fig. 8

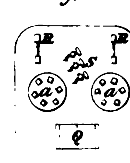
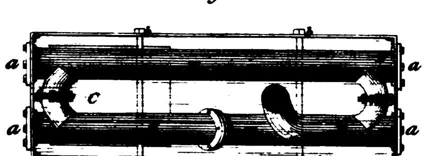


Fig. 5



W Newton Delin

April 1st 1839.

S Bellin Sculpt

Sleddon's Improvements in Spinning

Fig. 1

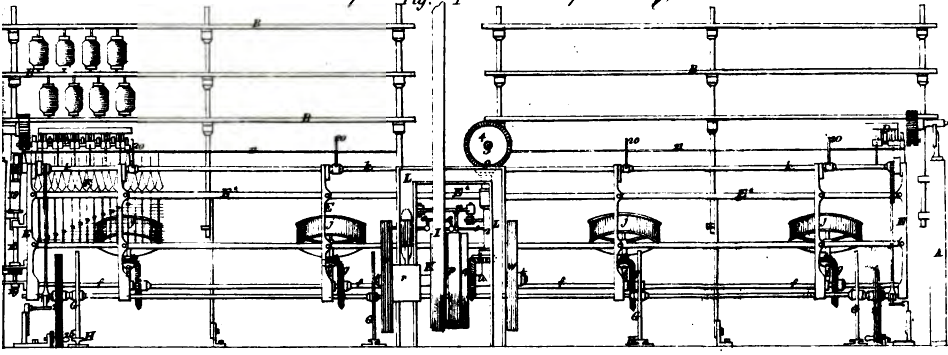


Fig 2

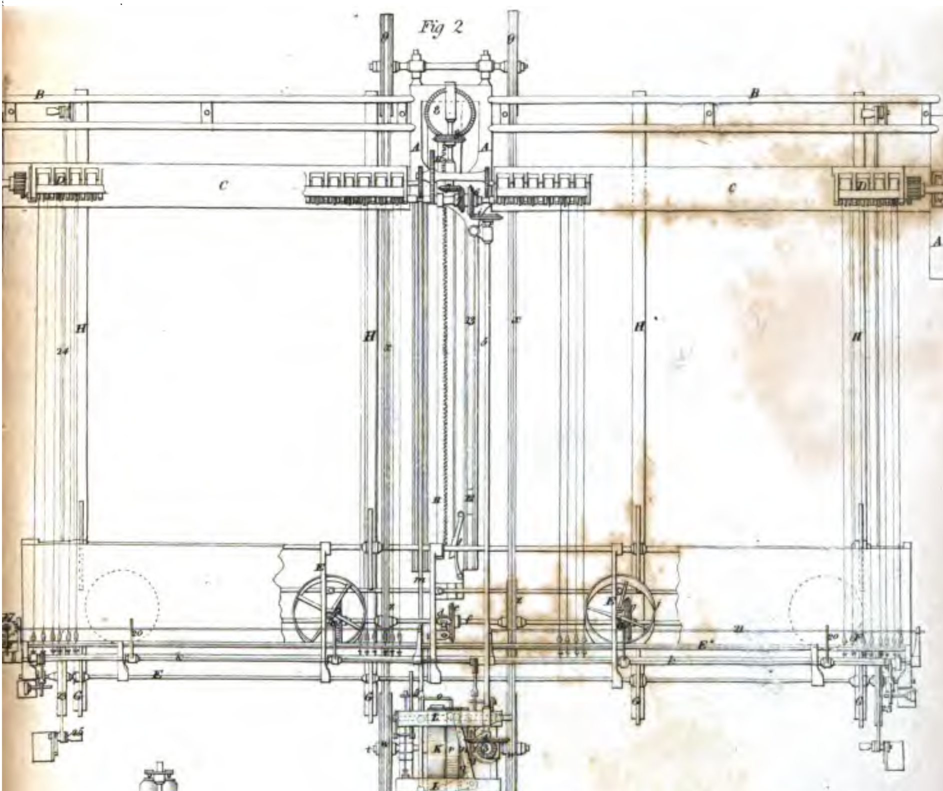
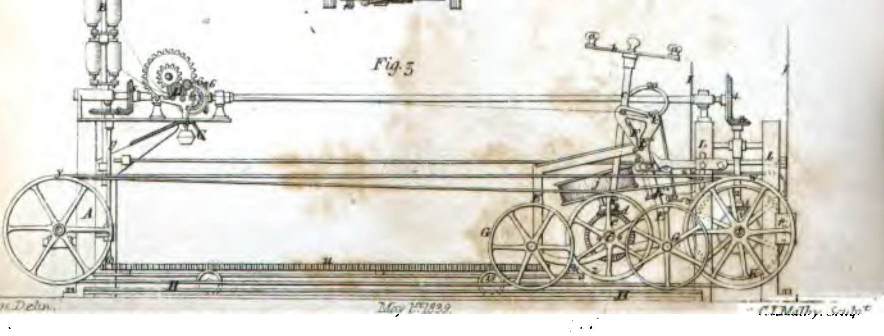
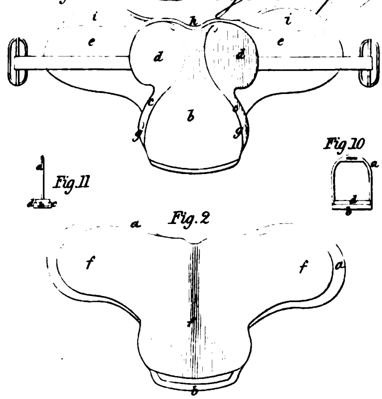


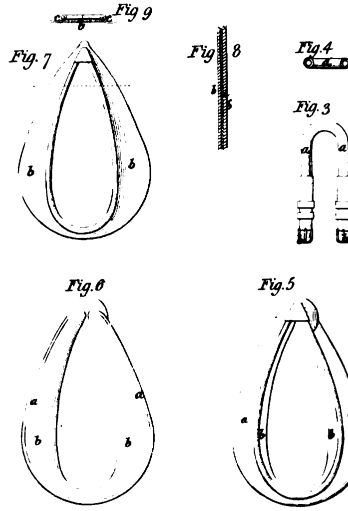
Fig. 3



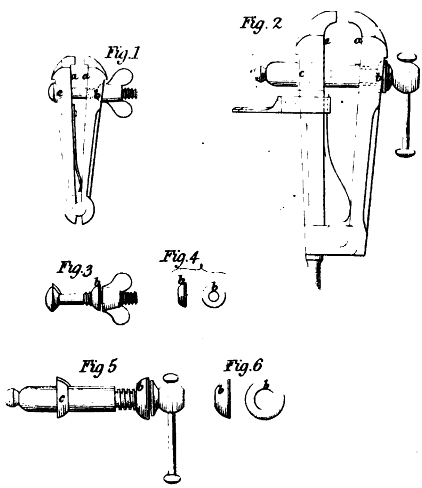
Newton Delin. May 1st 1839. C.I.Malby. Sculp.

Davy's Impts. in Harness

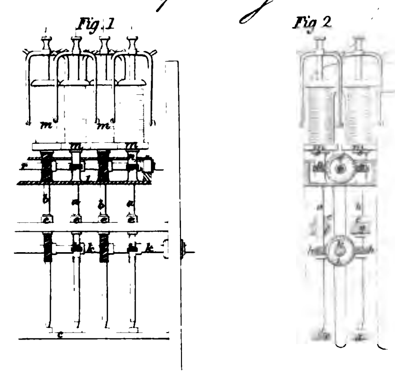




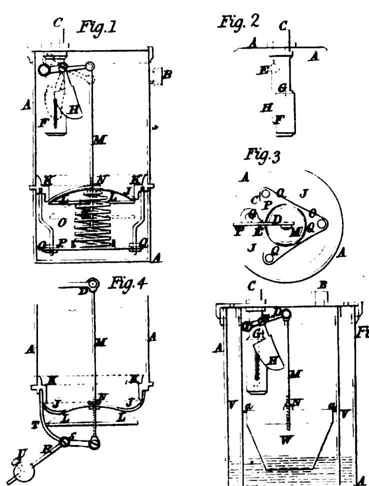
Chalklin & Bonham's Vices

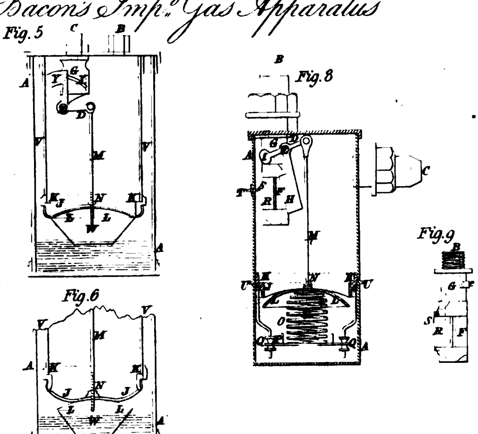


Fairbairn's Spinning Machy.



Bacon's Impd. Gas Apparatus





Naysmith's Imp^ts in plaining Metals

Fig. 2

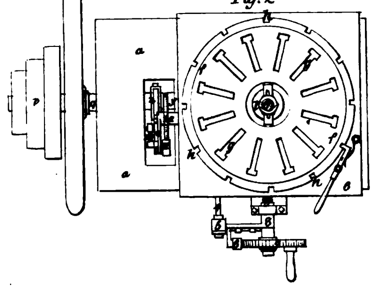


Fig. 3

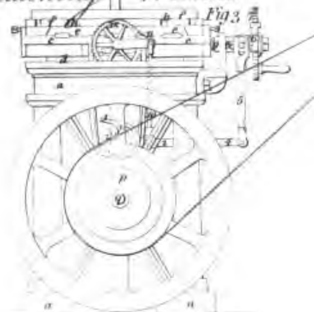


Fig. 5

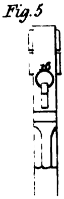


Fig. 6

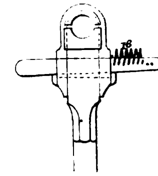


Fig. 1

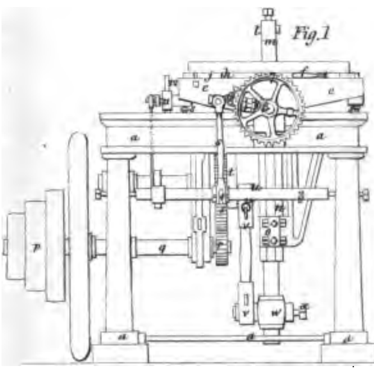
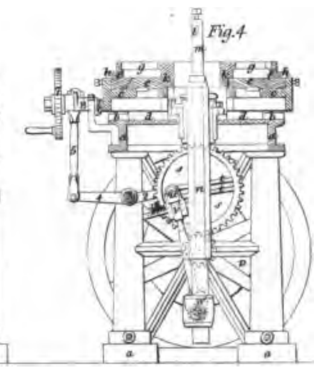
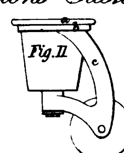


Fig. 4



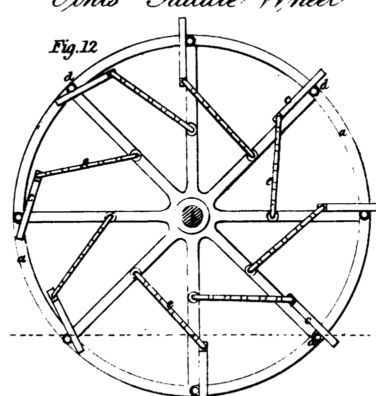
Lutton's Castor

Fig. 11



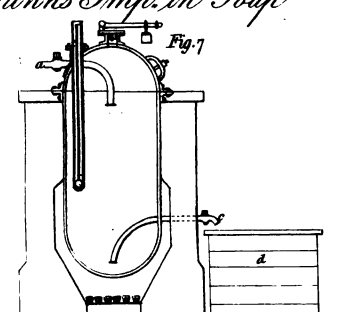
Vint's Paddle Wheel

Fig. 12



Dunn's Imp^ts in Soap

Fig. 7



Johnson's Imp^ts in Steam Boilers

Fig. 8

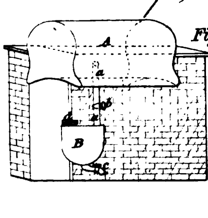
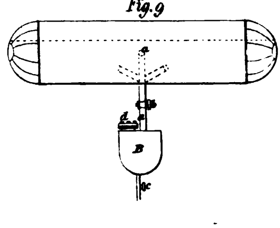
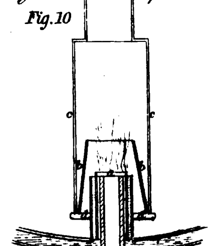


Fig. 9

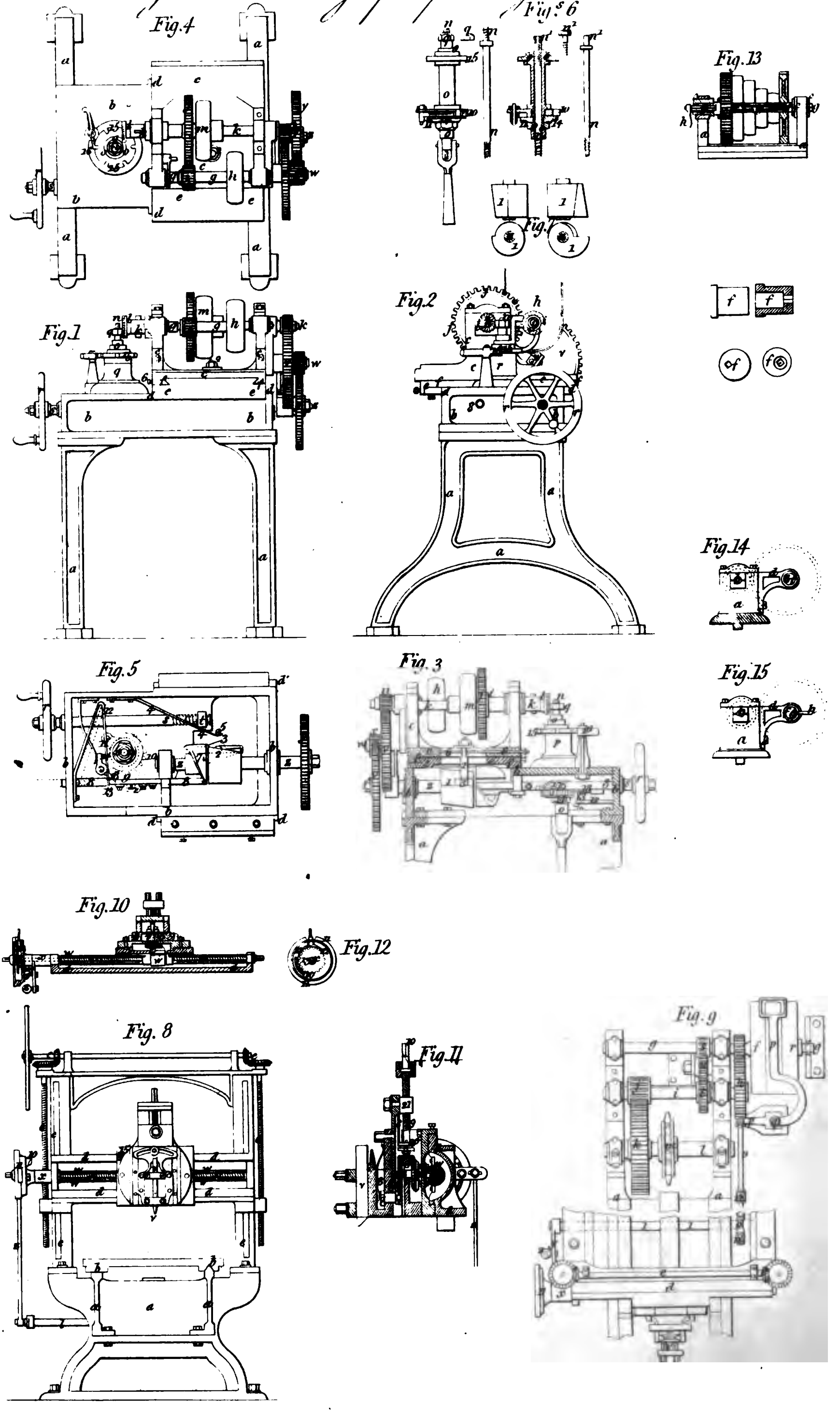


Bynner's Imp^d Lamp

Fig. 10

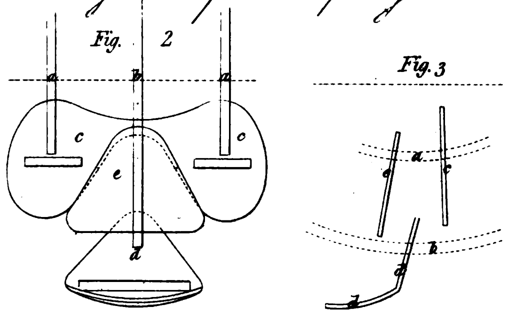


Haley's Machinery for planing Metals

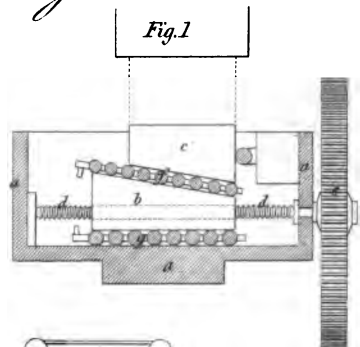


W. Newton Delin. June 1st 1839. S. Bellin Sculp.

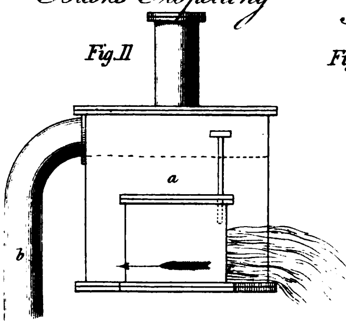
Rogers's Imp^ts in Propelling



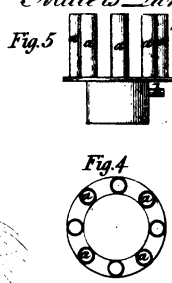
Garton's Press



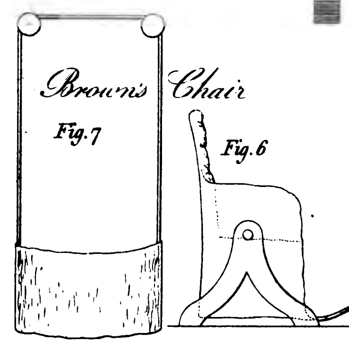
Busk's Propelling



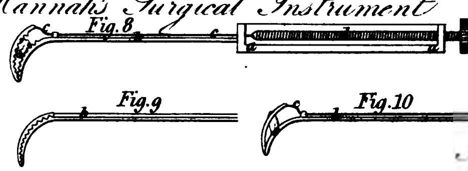
Miller's Lamp



Brown's Chair

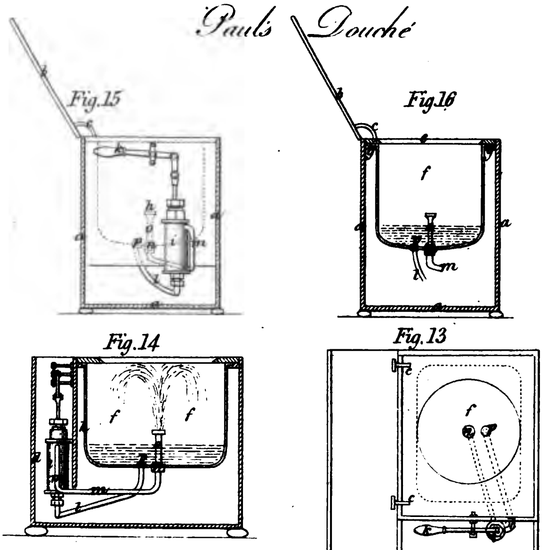


Hannah's Surgical Instrument

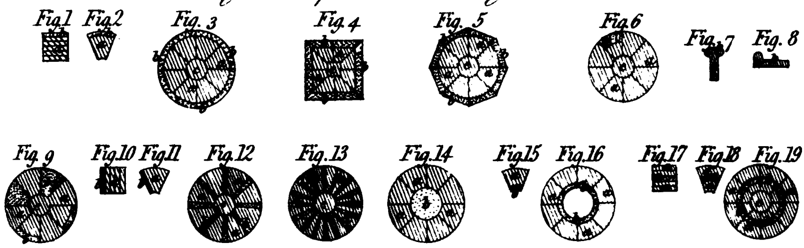


Kean's Spinning

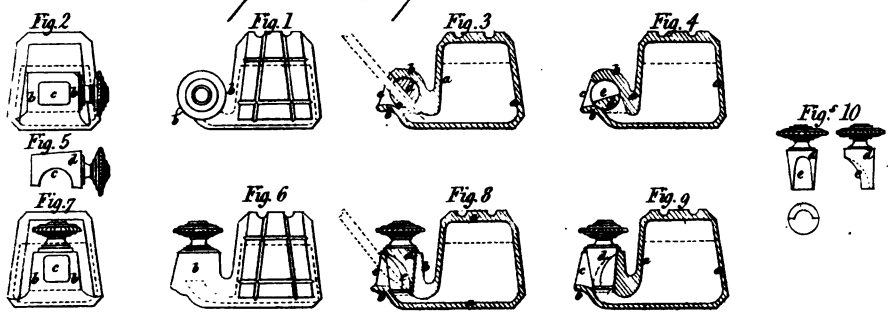
Paul's Douché



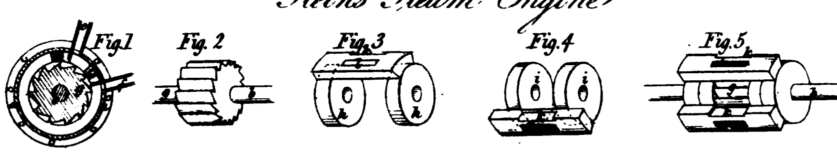
Hardy's Impts. in making Axletrees



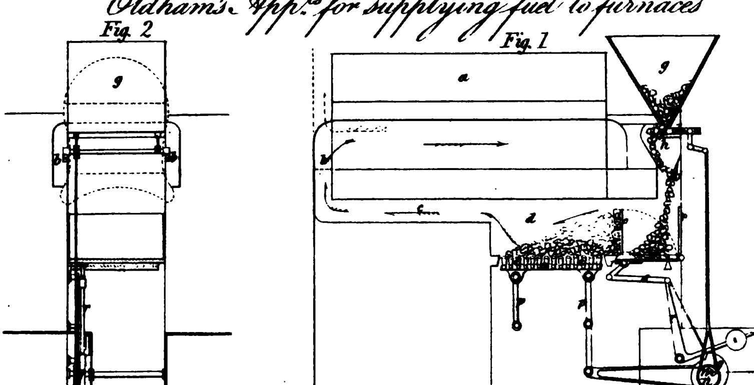
Stephens's Improved Inkstand



Stein's Steam Engine



Oldham's Appts. for supplying fuel to furnaces



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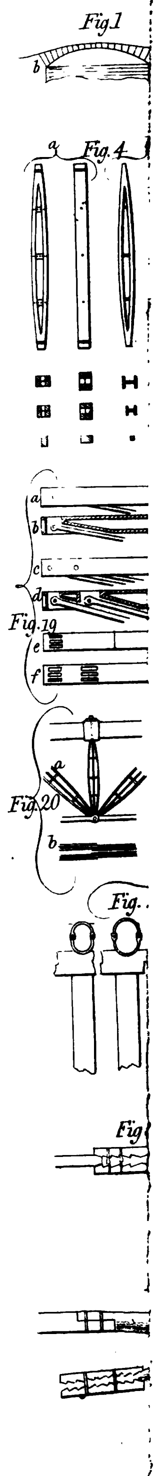


W. Newton Del.

Ody's Water Closet

Fig. 5

Fig. 1

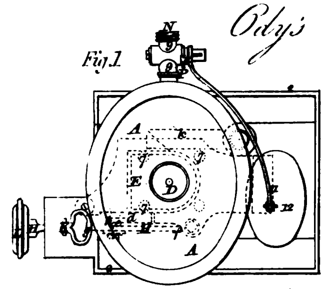


Fig. 3

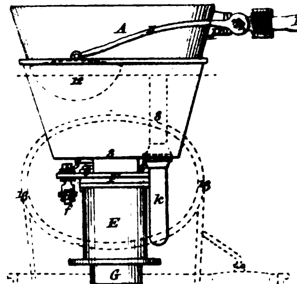


Fig. 2

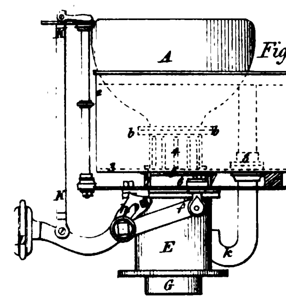


Fig. 6

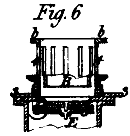
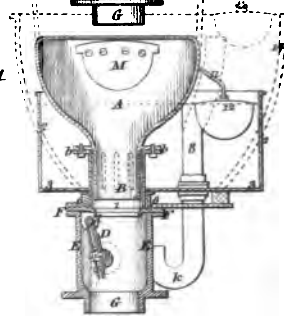


Fig. 4



Heberts Appts for storing and cleansing Grain

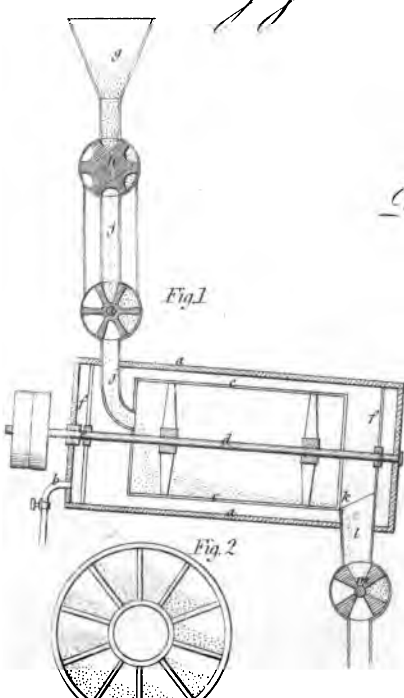


Fig. 1

Fig. 2

Craig's Steam Engine

Fig. 1

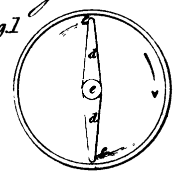
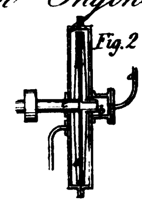


Fig. 2



Bates' Machy for finishing Hosiery

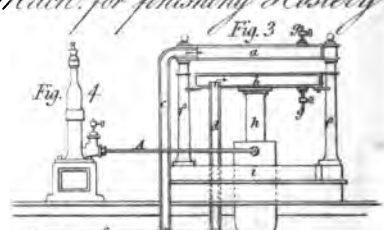


Fig. 3

Fig. 4

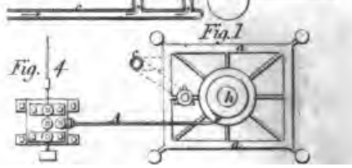
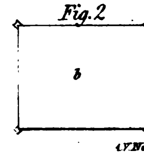


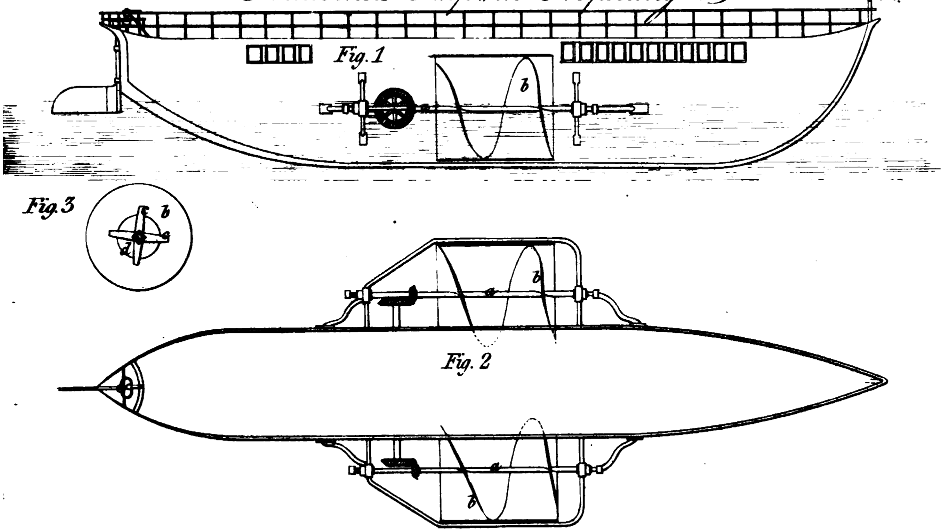
Fig. 4

Fig. 1

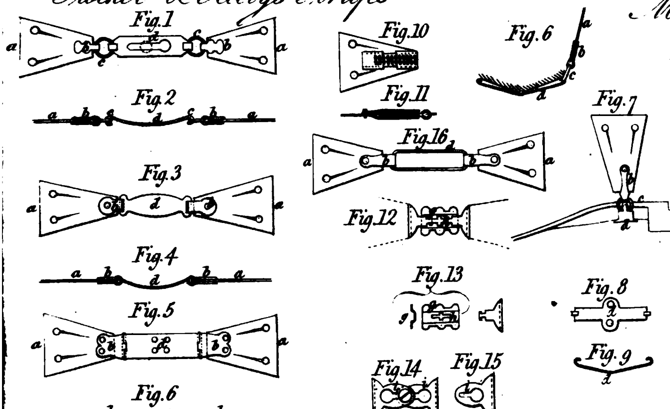
Fig. 2



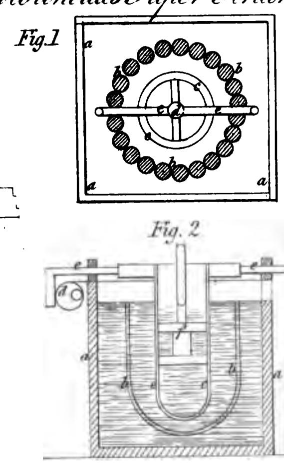
Fraissinet's Impts. in Propelling



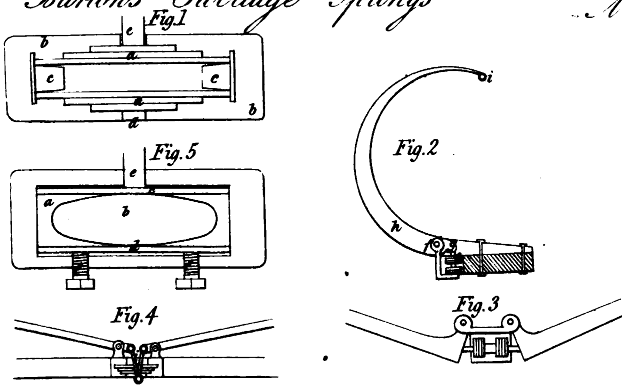
Stocker & Heely's Straps



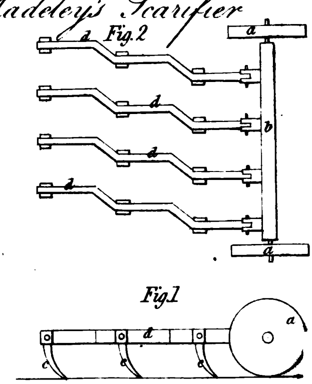
Molineux's Paper Strainer



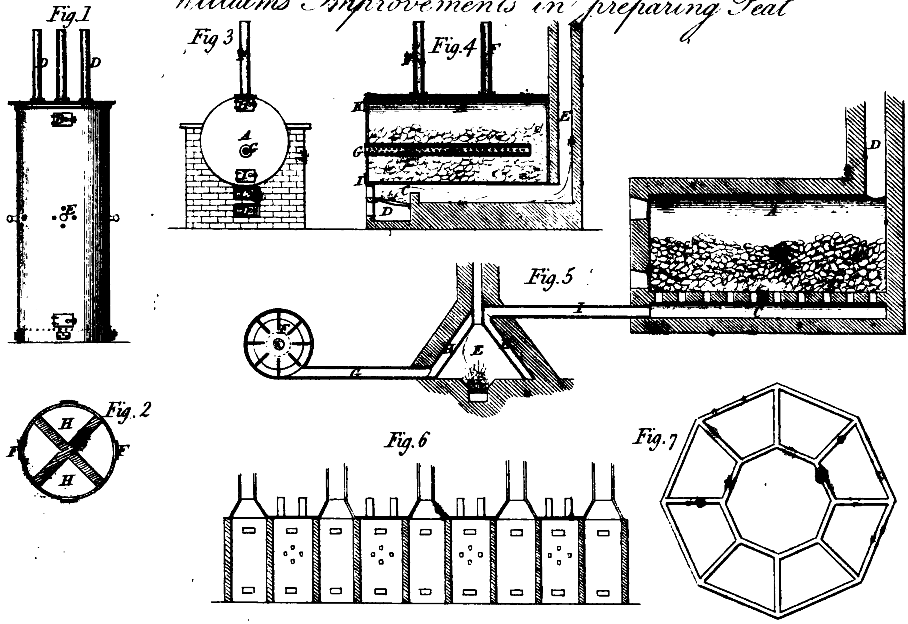
Barlon's Carriage Springs



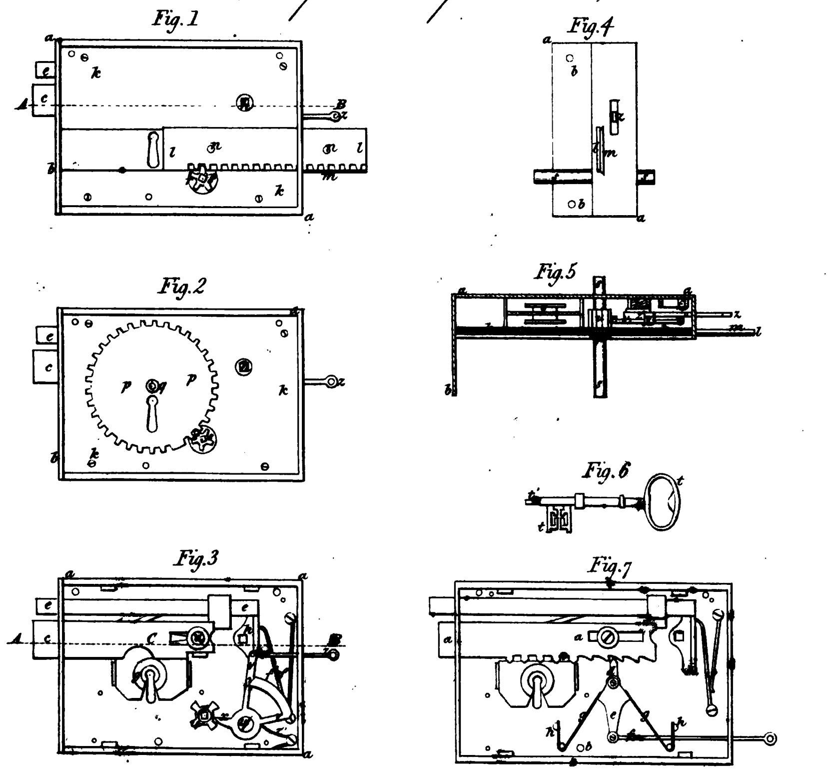
Madeley's Scarifier



Williams's Improvements in preparing Peat

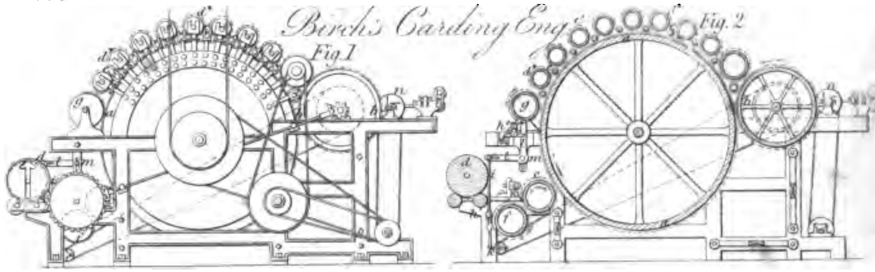


Thompson's Improvements in Locks

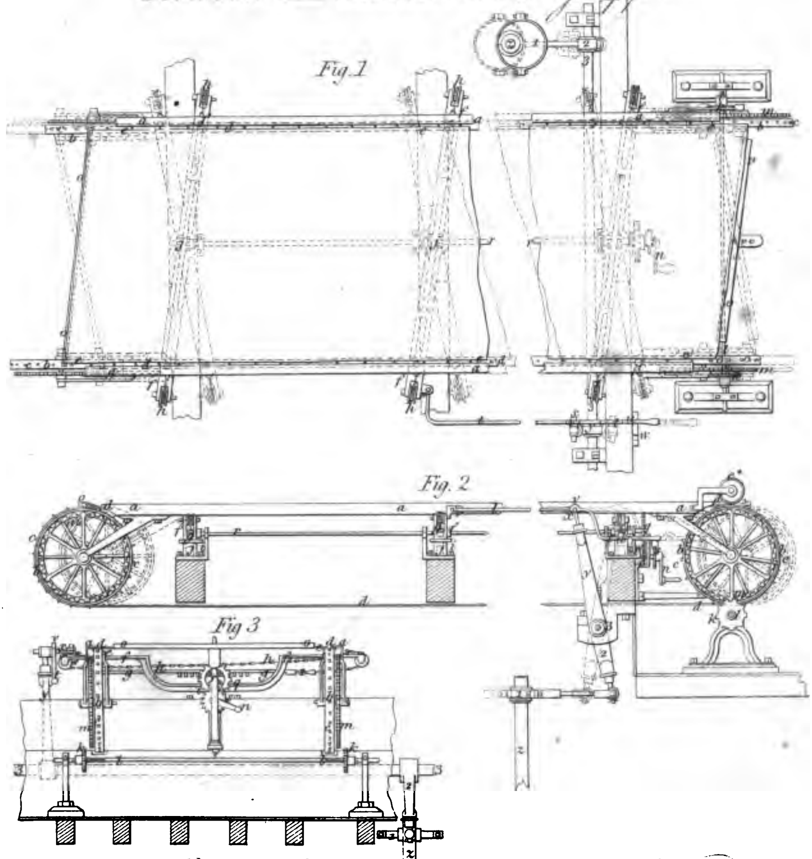


W. Newton Del.t August 1st 1839 A.V. Newton Sculp.

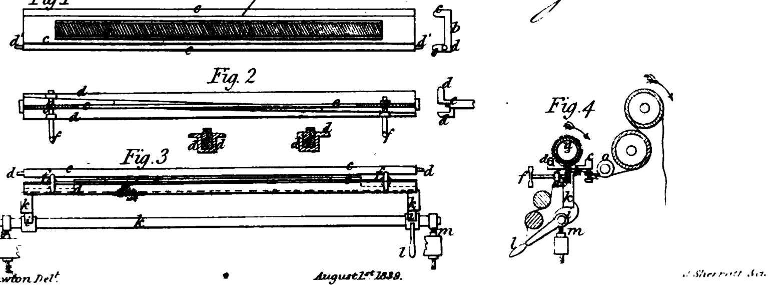
Birch's Carding Eng.



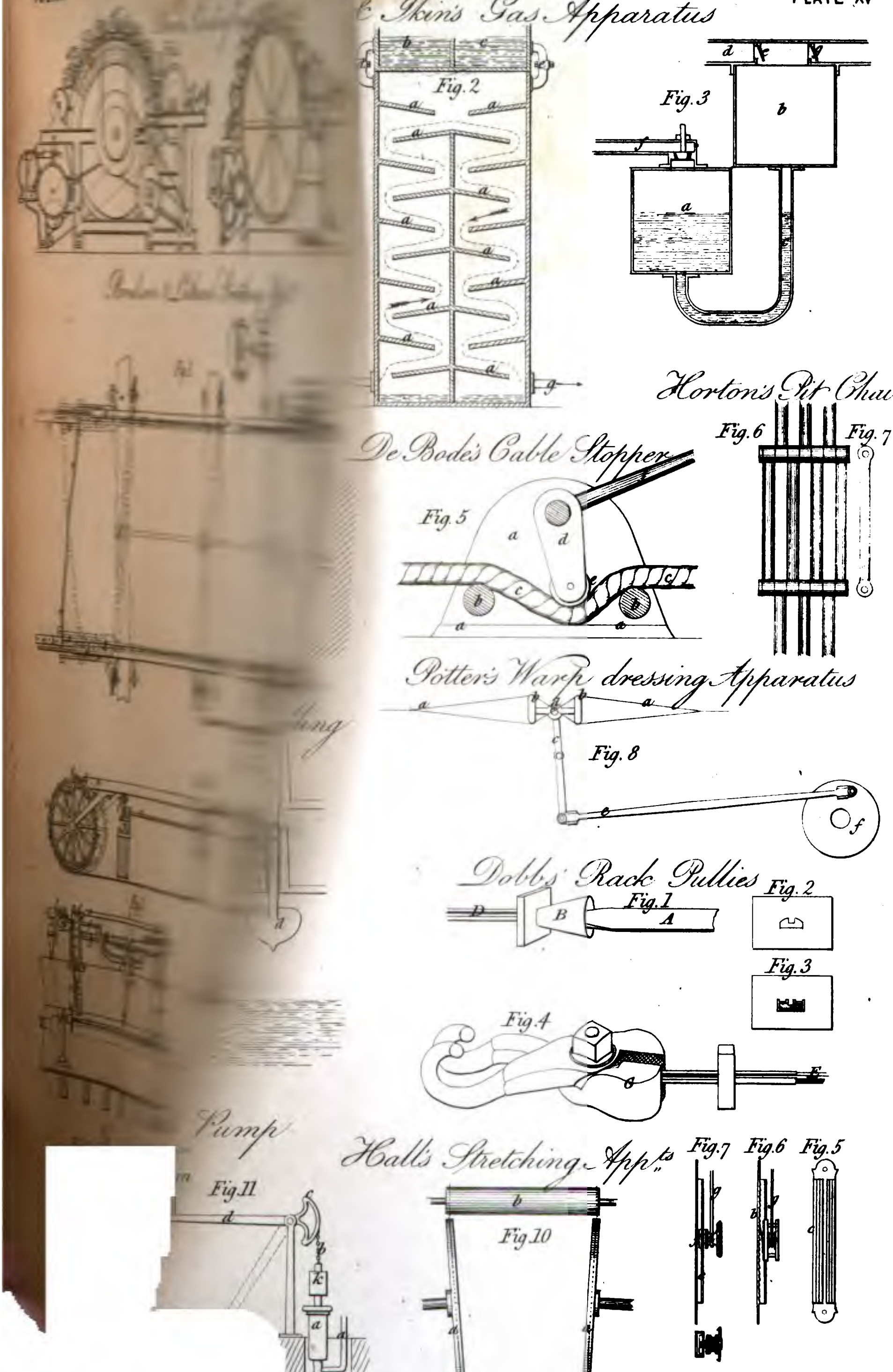
Bridson & Latham's Stretching App.



Davis' Improvements in dressing Woollen Cloth

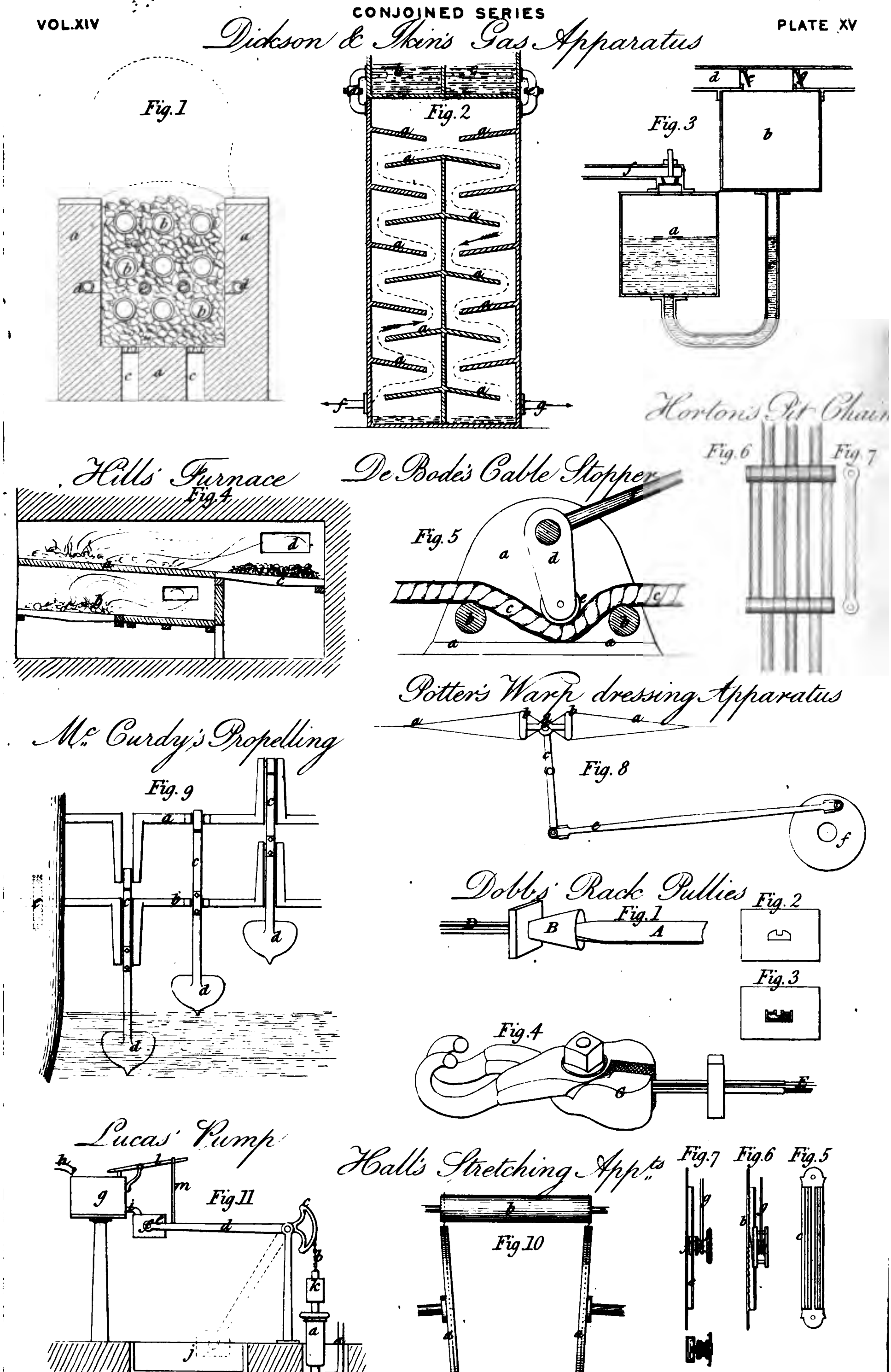


W. Newton Delt. August 1st 1839. J. Sherratt Sculp.



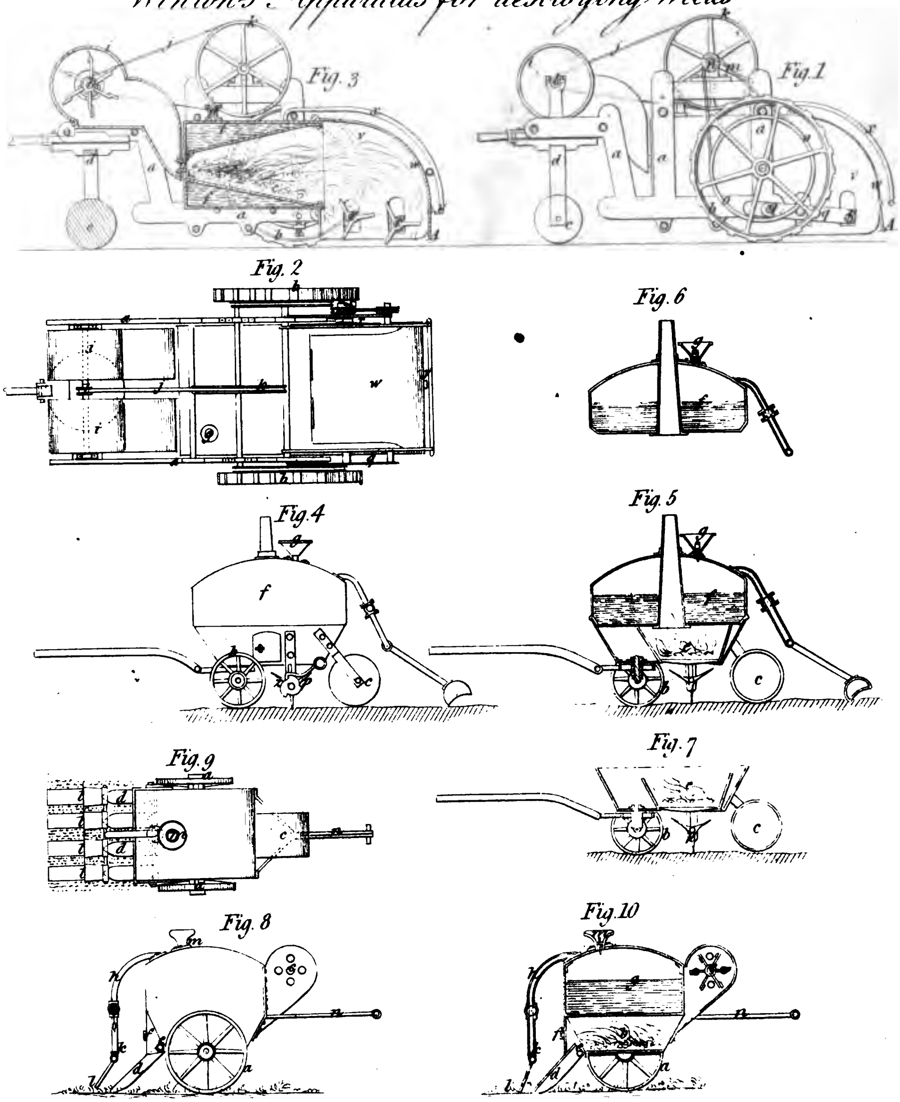
August 2nd 1839.

A.V. Newton Sculpt.

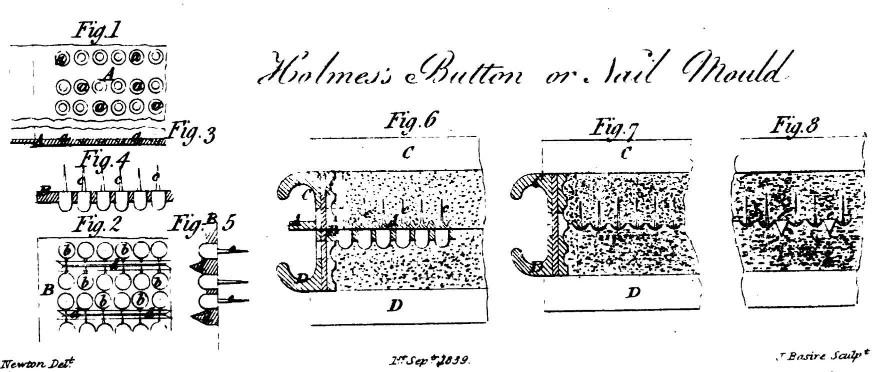


W. Newton Del.t — August 1st 1839. — A.V. Newton Sculp.t

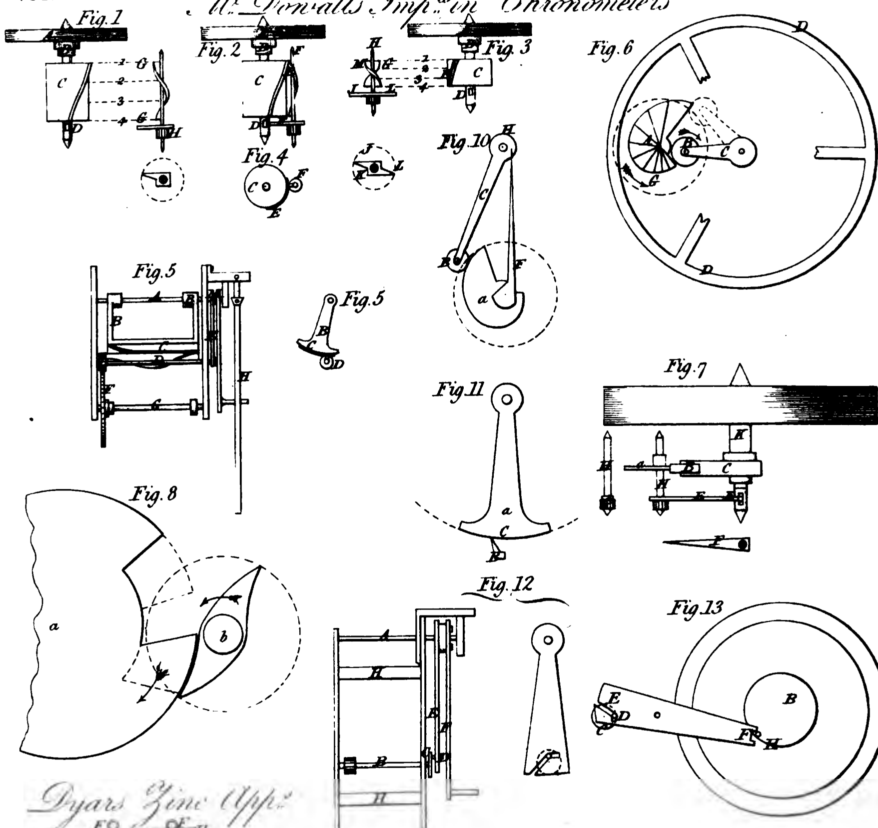
Winton's Apparatus for destroying Weeds

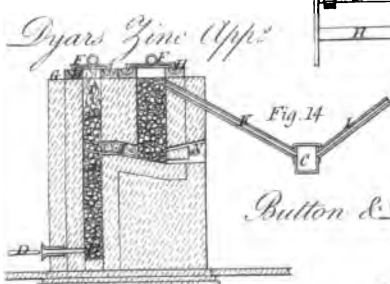


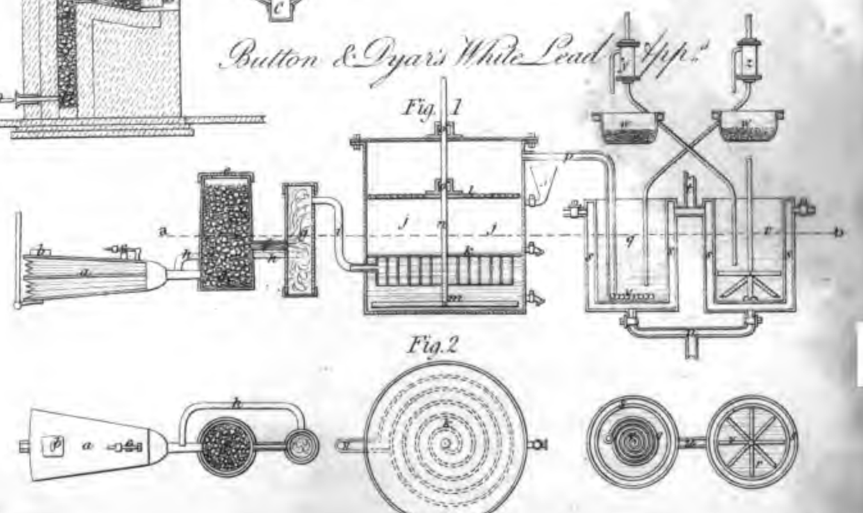
Holmes's Button or Nail Mould



W. Newton Delt. 1st Sept. 1839. J. Basire Sculpt.

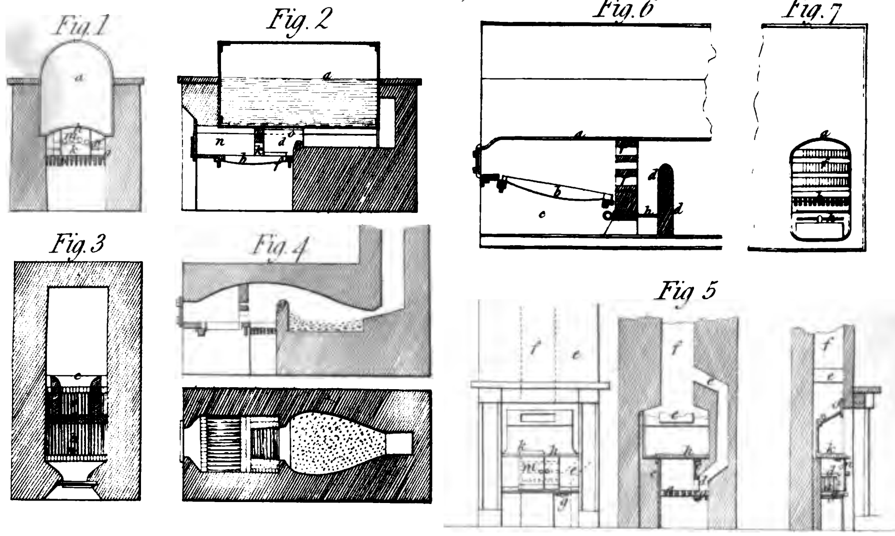




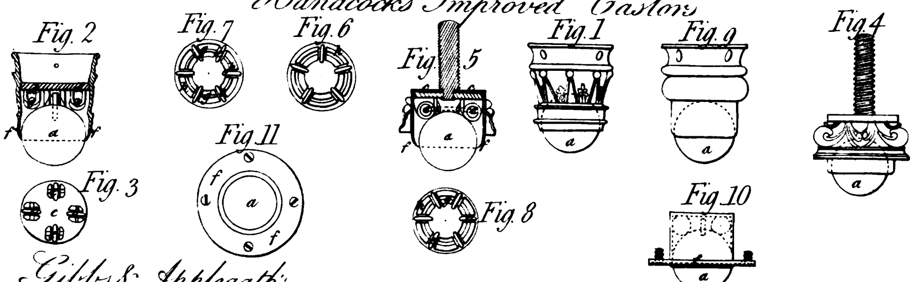


W. Newton Delin.

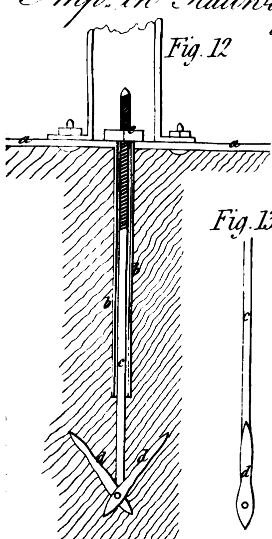
Rodda's Furnace



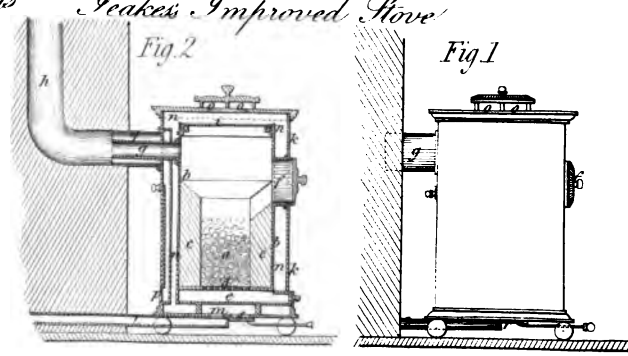
Handcock's Improved Castors

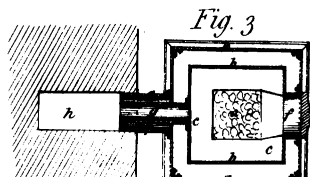


Gibbs & Applegath's Impts. in Railways



Jeakes's Improved Stove





Ball's Axletree